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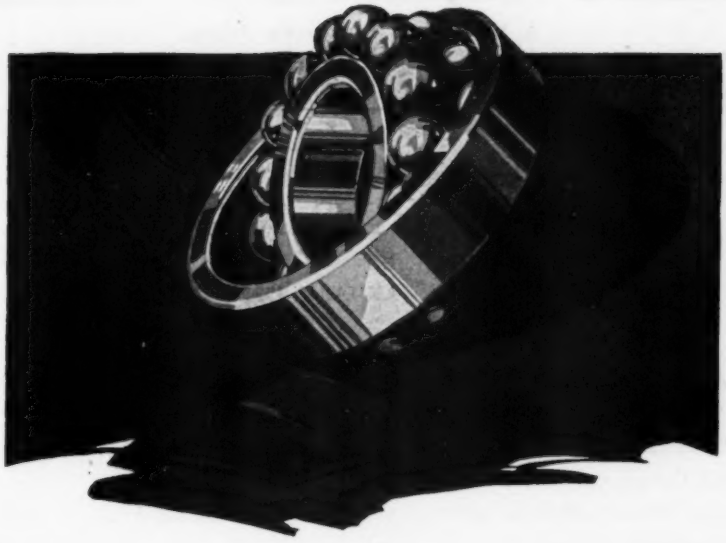

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Vol. 3—No. 10

THE PAPER INDUSTRY

A. SCOTT DOWD
Editor

A MONTHLY EDUCATIONAL JOURNAL
Devoted to the Interests of the Pulp and Paper Industry

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"1921—Necessary but Good"

THE YEAR 1921 has passed into history; the record is made; it is permanent; it stands and none of us can change it. It was one of the most unusual years in the history of American commerce and industry. We were talking along this strain with a prominent representative of the industry the other day and we were endeavoring to point out wherein 1921 was a good year, good for the soul of American business, and he made a remark which reflected a sentiment that is more or less generally held and with which we disagree. He made the statement that "1921 was a necessary evil," and we replied, "Yes, necessary—but not evil," for in our catalog of phrases we long ago abandoned any such slogan as "necessary evil." There is no such thing as a "necessary evil"; anything that is necessary is not evil; and anything that is evil is not necessary. Therefore, 1921 was not an evil year, evil in this sense being synonymous with the word "bad."

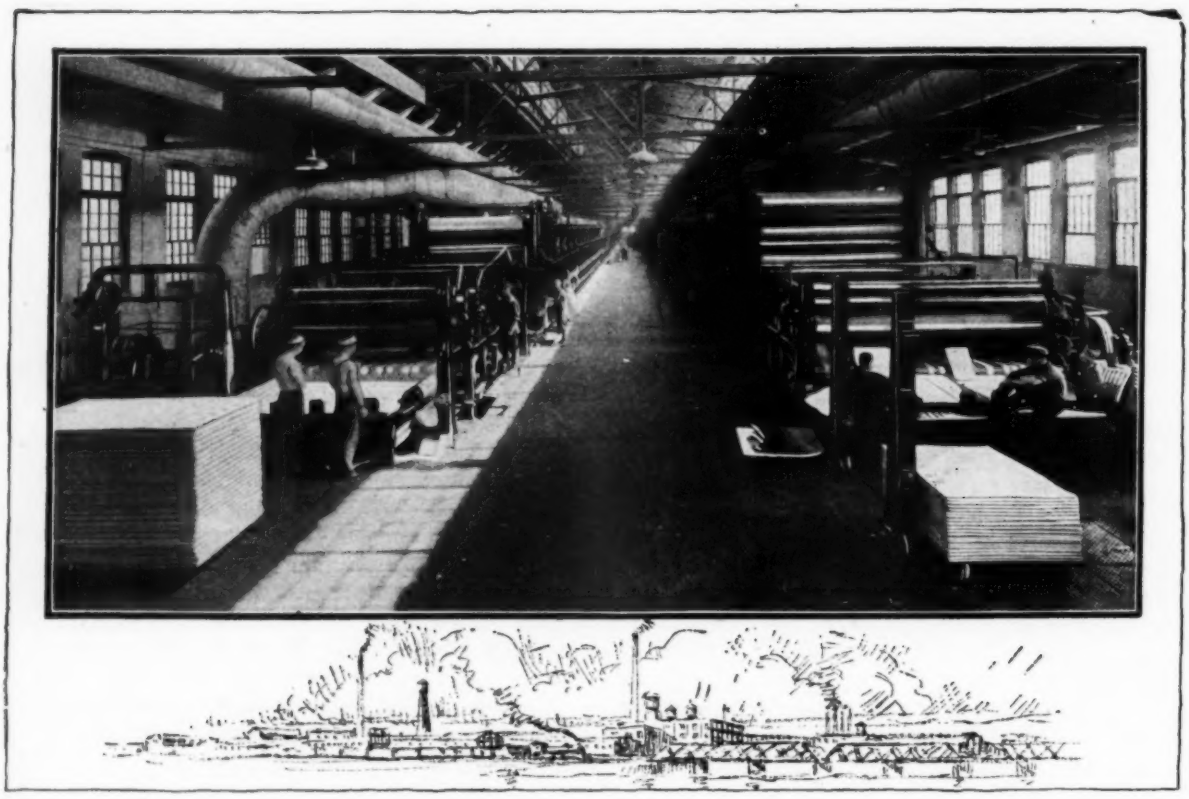
1921 was a year of great introspection. The great consuming public, the manufacturing and producing class had greatly expanded and overbought, and Jan. 1, 1921, found them all with huge inventories on which they took the worst financial walloping in the history of merchandising. Everybody had overbought; everybody had overbought in the desire to make more easy money. Conservatism had been thrown to the winds; thrift had been abandoned; easy money had been within the grasp of all classes of trade for a long time, and in the wake of this situation came all the baneful and injurious practices which follow a prolonged period of small effort, big profit and luxury.

During the year 1921, every active executive of every kind of industrial and commercial institution received a bad whipping. His stock holders and directors chided him unmercifully; his financial associates analyzed and criticized his business management unsparingly; his customers and market connections complained bitterly; his labor and salaried co-workers co-operated grudgingly. And as the administrative executive looked over the causes of all this year of criticism he laid it to the fact that he was caught on Jan. 1, 1921, with abnormal inventory. During the succeeding months, some time, these various executives retired to their inner consultation rooms, shut the door carefully, took off their hats, stood solemnly, and swore that by all that was holy they never again would be caught with heavy inventories at the end of the year.

It was thus that as we neared the end of 1921 the most vivid impression on the memories of these same executives was the solemn vow they had made not to be caught with heavy inventories at the end of the year. And they all with one accord began as far back as October to move out every pound of goods that could be sold and not to make any replacement thereof until after January 1. All this has come about through the twelve months of introspection on the part of the directing executives of our American commercial institutions, and in no industry has this introspection of the commercial practices and commercial situation been keener than in the paper industry.

It was the necessary thing to do, but the good thing to do, and it has resulted in the underwriting of the healthiest market outlook in the paper industry in the last ten years. Paper stocks, generally speaking, in the hands of consumers are completely exhausted; never have they been so small, and stocks in the hands of paper merchants are likewise generally the lowest they have been for years past. The commercial experiences of 1921 have as a net result brought just as abnormally low stocks as they were abnormally high a year ago. And just as the abnormally heavy stocks in all classes of paper in Jan., 1921, indubitably presaged a sagging, unstable and declining market on all paper products, so the abnormally low inventories of Jan., 1922, together with the abnormally low production of 1921, presage a stable market for 1922 with a constant tendency for values to increase.

The miracle of 1921 was that the commercial casualties were so few in number and so small in volume when compared with the enormous expansion of the years when we were in the war and the two years of terrific commercial expansion following. 1922 already has started out with a bang. The highly successful sixty million dollar bank deal made in the city of Chicago, one of the biggest, bravest pieces of commercial optimism, should be viewed with joy and confidence and considered a harbinger of a better, bigger, commercial and industrial 1922.



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"Sirocco" Fan. The type used in the Michigan Carton Company's installation

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A Wider Application of the Results of Forest Products Research

THE TIME for impressing upon the minds of our national legislators the importance of appropriating adequate funds for the carrying on of the work of the United States Forest Products Laboratory at Madison, Wisconsin, has again arrived. Congress has now convened, and discussion of the National Forestry Program is being held before the House Committee on Agriculture, of which the Honorable Sidney Anderson of Minnesota is chairman. The Secretary of Agriculture and the Director of the Budget have approved $340,000 for the research work of the Laboratory for the fiscal year beginning July 1, 1922, or only fifteen thousand dollars more than was appropriated last year. It will be remembered that last year the Forest Products Laboratory was successful in securing an advance of $75,000 in this appropriation, which brought the amount to $325,000, an amount generally conceded to be far below that which was actually needed, but thanks were expressed for what they got.

In calling the attention of our readers to the importance of communicating with their representatives in Congress to the extent of getting them interested in urging a moderate increase in this appropriation, The Paper Industry respectfully presents some of the facts regarding the practical possibilities that can be accomplished by the Laboratory for the economical betterment of our industry if adequate funds were provided.

There has been accumulated in eleven years of research at the Forest Products Laboratory a wealth of fundamental knowledge of immense value to the wood-using and consuming industries, and each year it is becoming of greater importance to devise ways and means whereby this information can be put into effective use. Personal interviews, correspondence, government publications, articles for trade and scientific journals, news and technical notes, instruction courses to trade representatives and special investigations in direct co-operation with industries are all used by the Laboratory with more or less success to accomplish this object. **From one fifth to one sixth of the total amount appropriated annually has been used in these ways.** But the degree of accomplishment is slight compared with the progress made in the research work or compared with the tremendous possibilities for economic savings if all of the results were broadly and intelligently applied in the industries. This situation will continue unless definitely recognized as a problem to be handled, and ways and means developed for its effective solution. Within a reasonable period of time, it is believed that as much if not more funds should be annually expended by the Laboratory on this phase of the work as on the fundamental research. A limited number of very specific dissemination activities would involve an expenditure for the coming year of at least $100,000. It is felt that an appropriation for this amount would be well worth while as a starting point towards the development of a more progressive policy in the dissemination and application of results of research.

In a statement prepared by the Forest Products Laboratory, attention is called to some conspicious examples of industrial waste and the amount of money that would be required to greatly reduce this waste by applying more of the results already obtained in its research. One opportunity in the reduction of waste is in the reduction of wood pulp decay. The annual loss of wood pulp through decay is known to amount to many millions of dollars. It is recommended that for the reduction of this waste and for the reduction of others in the wood-using industries, such as the

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introduction of preservative treatment of mine timbers; promotion of scientific methods in the kiln drying of lumber, and standardization of building codes, through dissemination by direct and personal contact, a minimum of $40,000 should be available. This fund would provide the maintaining of a number of technical specialists who would be engaged in visiting industrial operations and giving assistance in the improvement of their methods, and applications of more efficient ones.

The sum of $20,000 is asked for in order to continue the short instructional courses in kiln drying and box making which the Laboratory has been giving at monthly or bi-monthly intervals.

Many problems under investigation in the forest products field, after reaching a certain successful stage in Laboratory research can be carried no further until tried out, demonstrated, and more or less modified on an actual commercial scale. This means the development of co-operative relationship with some commercial concern that is willing to permit the use of its equipment for the trial. The idea may not prove successful on a commercial scale and may cost the company considerable money as a result of the tying up of equipment, etc. Experience has shown it to be difficult to arrange satisfactory commercial co-operation of this nature if the co-operator is asked to bear all the expenses, and the progress of the Laboratory has been hampered insofar as funds have not been available for such application. Conspicious among such problems are those of the de-inking of old newspaper to make pulp for re-use in the manufacture of newsprint, and the bleaching of southern pine for pulp. The complete utilization of all waste newspapers would amount to over 45 percent of the present tonnage of newsprint produced in the United States, which would mean a theoretical possible consumption of spruce and balsam for this purpose amounting to 850,000 cords per annum. The Laboratory has developed methods of pulping and bleaching southern pine pulp for book and magazine paper, and this project should be carried to a commercial conclusion in co-operation with the proper paper companies. A minimum fund of $20,000 for commercial demonstrations of this kind should be available.

During the past year about twenty thousand dollars was expended for direct industrial co-operation, all of which was received through co-operative sources. This service consisted of putting the results of the Laboratory's research into practical service by undertaking specific tests and investigations in co-operation with commercial interests. In such work the knowledge and experience of the Laboratory are brought to bear upon the solution of a particular commercial problem. Several men should be effectively kept on the development of this phase of the Laboratory's work. It is felt that more effective results would be secured in the long run if the cost of such co-operative work could be borne mutually by the Government and individual. A minimum fund of $20,000 is desired for such work for the coming fiscal year.

Next Superintendents Convention, Kalamazoo, June 2 and 3

The Executive Committee of the American Pulp and Paper Mill Superintendents Association, has decided to hold the next annual convention of the Association at Kalamazoo, Michigan, on Friday and Saturday, June 2 and 3.

Invitations will be sent to both the Technical Association and Cost Association of the Paper Industry with the hope that these Associations will decide to hold their meetings at the same time in conjunction with the Superintendents.

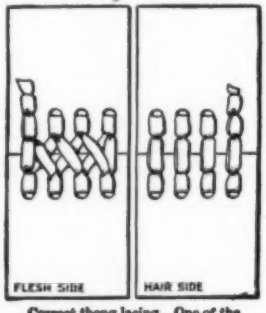
Look to Your Belt Lacings to Reduce Replacements

What Do Past Experiences Tell You?

Enlightening Experiences Can Not Be Ignored

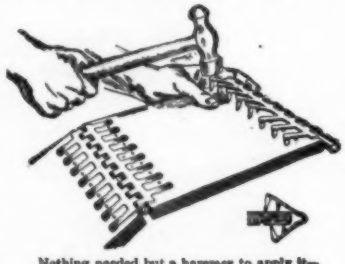
If belt lacings were selected as carefully as the belts themselves are, there would be a remarkable decrease in the overhead of annual belt repairs and replacements.

Twisted and torn belts, caused by uneven distribution of the pull; slack and slipping belts caused by the stretch in the rawhide



Correct thong lacing. One of the best until Alligator came.

lacing; belts that "jump" at the pulleys because improperly laced —all these ailments originate in a weak unsatisfactory joint.



Nothing needed but a hammer to apply it— and you already have a hammer.

Alligator Steel Belt Lacings A Cure for Belt Ailments Caused by Poor Lacing

An Alligator steel laced belt is free of these ailments which are so often forced on healthy belts. Strong, durable, adaptable to all belts because of its great variety of sizes, Alligator is the most popular and widely used belt fastener today.

Advantages Appreciated by Belt Men

Alligator makes a perfect joint which hugs the pulley. The sectional rocker hinge pin takes up the wear and adds to its flexibility. The steel teeth are driven through the belt and clinched on both sides so that the edge of each tooth is presented to the

Showing teeth disengaged with rocker hinge. And in proper position back to back. Also completed joint.

strain. This prevents cutting the lengthwise fibers carrying the pull thus **preserving the full strength** of the belt.

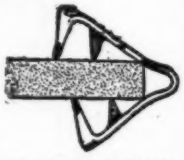
"Nothing Needed But a Hammer"

Any workman can apply the ALLIGATOR fastener in three minutes average time with nothing but a hammer. That is the wonderful simplicity of ALLIGATOR and a reason for its remarkable popularity. "It never lets go"—that is its reputation among those who use it exclusively and know its worth.

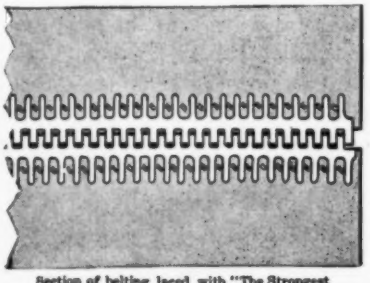
The Alligator joint is so smooth that it can be run with either side in contact with the pulley and is found satisfactory on any size — transmission, conveyor or elevator belting.

Many Big Plants Use Alligator Exclusively

Once Alligator has been given an opportunity to display its convincing performance it is only a matter of time before it is in use on all the belts in the plant. The unusual excellence of its service as compared with rawhide and other lacings in actual service as well as in any special test, is the best guarantee that it is the superior type so much needed in factories and plants where belting break downs are a source of expense and delay.



Actual size of No. 25 Alligator for single leather or 4-ply fabric 3-16 to 9-32 thick. Note double staggered teeth.



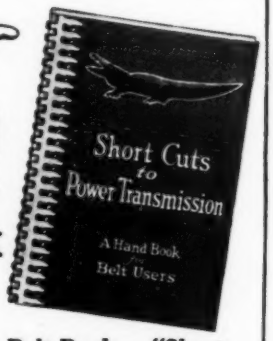
Section of belting laced with "The Strongest Belt Lacing on Earth."

Rawhide Lacing Expensive

The cost of any lacing as compared to the value of the belt is almost nothing. Yet in performance, if the lacing shortens the life of the belt, it becomes an item of major importance **in expense.**

Every recurring trouble with a rawhide lacing carries its own charge which when totaled with the initial cost of the belt, when it is finally "knocked out," mounts up into quite a respectable figure. And there is no good excuse for this expense when there is a simple, efficient method on the market which is an absolute remedy for such a condition—ALLIGATOR steel belt lacing. Investigate!

Send for this Book Now



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On the Way There

By R. L. S.

EVERY man likes to go to a fire, but not all are willing to handle a water bucket. The fires of dogmatic hate and the lust of hell do not pertain alone to the so-called religious world. Church is neither a building nor a number of people. Perhaps few would have selected Abraham Lincoln as teacher for a class in Sunday School; certainly, he had little use for dogma or creed, yet he knew the way to reach the heart bowed down and bring comfort and love to the needy.

If George Washington were to attend morning services in a modern church gathering, his manner of conduct in life might be most severely criticised, yet he led his country up out of the mire which was correlative with slavery, as, through stripes, those early devotees of freedom purified a United States of existence to express more of that for which they were established.

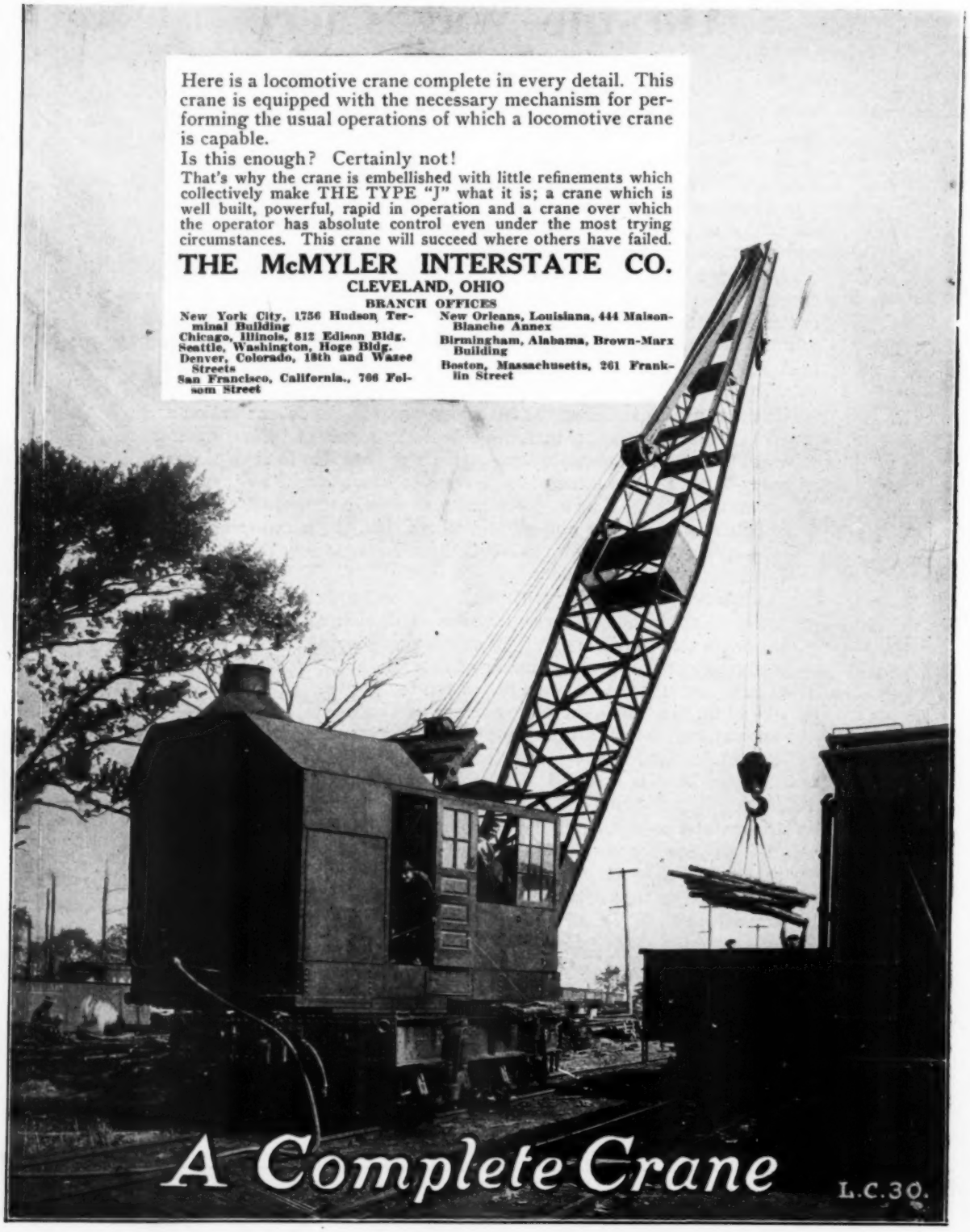
The equanimity and dignity of Washington, plus the determination and love of Lincoln, were prime qualities essentially a part of the very mental fabric of the land they chose to serve. It is high time that the business man of today began to take some of the lessons to heart taught by these men. There are slackers in time of peace and war alike, and there is no slacker more detrimental both to himself and others than the moral slacker, who shuns a struggle with his own habits because he is too lazy to trouble himself that the world might gain.

But there are men today with head erect and eyes on the future that they may catch the bugle note of progress. This class of business calibre is straining its genius, not in gyrations of retreating morals, clinging to paths worn threadbare with defunct habits of thought, but in the opposite direction, doing the things that are a fit pattern for the veriest child as well as for the adult. To teach others, we must be true ourselves, and the man who is waiting for success in his business today must keep his morals in advance of his money, else things will get twisted. Between constitution and conscience, the bond is strong today, and one's conduct is important to his business.

Clean water must have clean channels to flow in, or the virtue is tainted. Authors, editors, owners, as well as manufacturers, might as well take time by the forelock as by the fetlock. Washington knew the time to do his work was NOW and made the sacrifice of personal ease essential to draw the issue to a conclusion. What gave Lincoln the persistence that won was that determination to share in a nation's progress at any cost to himself. There is no sight more sorry than the vision of capacity entangled in a mesh of habit.

All honor to the man today who has the vision to see what is the greater good for his fellow man and take his stand. Whether this be manifested in more generosity between employer and employee or whether it be a stern example of business or private morality, that man is ON THE WAY THERE.

Latest Development in Locomotive Cranes for Handling Coal, Pulp Wood, Etc.


Here is a locomotive crane complete in every detail. This crane is equipped with the necessary mechanism for performing the usual operations of which a locomotive crane is capable.
Is this enough? Certainly not!
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Continuous Automatic Washing of Wood Pulp

By H. A. MORRISON

WASH pans and even diffusers are scheduled to disappear from the up-to-date pulp mill since continuous vacuum filters of the drum type have been introduced into the wash room.

Filters have been in commercial use as brown stock washers less than two years, but there is nothing new about this application, since many operators have repeatedly suggested, during the past few years, the possibility of recovering cook liquor from digested fibre by means of filters. After this comparatively short period of experimentation, it may now be definitely announced that drum filters meet every requirement of the most exacting operator and show a remarkably wide margin of advantage over either the pan washing method, considered standard practice in soda mills, or the rather more efficient diffusion system as operated in most Kraft plants.

Development

Although drum filters were widely known and highly perfected in the metallurgical and chemical fields, and had earned the sincere approbation of sugar house officials, to mention only a few of the numerous industries in which they were active, the earlier attempts to handle fibre were uniformly unpromising. It was most difficult to keep the heavy wet sheet of pulp from falling off the drum just as it emerged above the level of the fluid stock in the filter tank and in the few cases where a reasonably coherent cake was built, it was impossible to recover more than a small proportion of the cook liquor. No satisfactory means of holding on and smoothing down the cake was devised, although various attempts were made. The use of two or more filters in series, to improve soda recovery without undue dilution of black liquor was considered the most promising line of attacking the wash problem.

Almost over night all obstacles were removed and complete success assured by the discovery that the proper dilution of the filter feed was by far the most important consideration when filtering wood pulp. This point cannot be too strongly emphasized. Any mixture of digested wood pulp in cook liquor wherein fibre does not exceed 1% by weight will form a beautiful, compact cake of uniform thickness and porosity when delivered to a drum filter which has been arranged and designed for this purpose. So far as known, there are no exceptions to the above statement. On all kinds of chemical pulp—soda, sulphate and sulphite, or mixtures of these—when cooking poplar, pine, spruce, gum, chestnut or any of the other varieties of wood commonly used—filter feed containing not over the stipulated 1% of fibre—drum filters have shown capacities and washing results of such excellence as to plainly entitle them to careful consideration of every pulp maker.

Best washing efficiency, lowest dilution of evaporator feed liquor coincident with highest recovery of chemicals is realized when filter cake does not exceed ¾ inch in thickness.

In all continuous vacuum filter operations, the filter media must be selected with extreme care, having due regard for durability, capacity and clarity of filtrate. The early tests plainly demonstrated that the closely woven cotton, woolen and metal fabrics used in other industries, were entirely unsuited to this problem. The general use of fairly open weave

Contest Not Yet Decided

THE PAPER INDUSTRY shares with its contributors, the disappointment in not yet being able to announce the names of the winners in the 1921 contest.

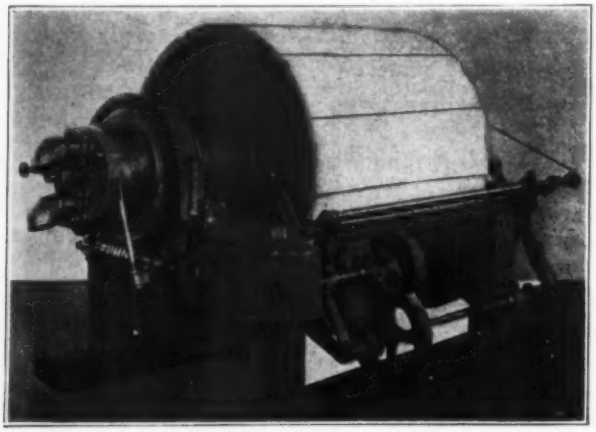
The four judges, whose names were announced in the last issue, are equally desirous with The Paper Industry in getting through with this proposition in the quickest possible time. It is essential, however, that their decisions agree, and the fact that they are situated at a great distance from each other makes it necessary for them to come to their agreement through the medium of correspondence.

Unfortunately, various matters have interfered with the judges getting together, among which was the serious illness on the part of one of them. The latter is recovering, and it is believed that the coming month should see their ability to announce the names of the successful writers.

We earnestly ask our contributors to try and exercise the same patience we are trying to do and share in our hope of being able to publish the names of the winners in our February number.

wire cloth on Fourdriniers naturally led to trials of similar woven wire cloth as filter media on drum filters and this plan met with immediate success. On soda and Kraft stock, a 60 mesh monel metal cloth may be considered the standard. Phosphor bronze cloth of the same mesh is best for sulphite pulp. Filtrates are remarkably clean and cloth wear is negligible.

Unusually large volumes of hot foamy liquor of high density—volumes amounting to upwards of 400 G. P. M.—must be removed as filtrate even on a small filter with only 100 square feet area. These



exacting requirements have been met by a filter having large internal vacuum pipes, special large diameter automatic valve and equipped with a round bottomed filter tank which is fitted with a slow moving swing agitator. In designing the pulp filter, the well established practice in other technical operations was modified and adapted to stock washing under the advice of men widely experienced in the manufacture of pulp.

Arrangement of the dry vacuum system, redesign of receivers, provision for condensers and moisture traps, proportioning vacuum pump displacements per unit of filter area, selecting proper sized centrifugal pumps to remove the hot foamy liquor without undue loss of temerature, all necessitated careful study but presented no serious difficulties.

There was little question about the choice of structural materials for building the filters themselves. Extensive experience in handling caustic lime mud had established the suitability of either cast iron or steel, or the two in combination, for the machines when used in either soda or sulphate mills. As previously stated, woven monel metal cloth is entirely satisfactory as a filter medium in pulp mills which cook in a caustic liquor. Filters designed to wash sulphite stock would be largely of wood and all metal parts would be of hard lead or other alloys which resist the corrosive action of sulphurous acid. However, filters have not as yet been placed in commercial use on sulphite, mainly because the cook liquor is of little or no value under present conditions.

Before giving a detailed description of the operation of vacuum filters in a wash room, it seems advisable to briefly touch upon the two older and better known methods.

Pan Washing

In most soda mills, brown stock washing is conducted in open rectangular tanks, called pans, which are fitted wtih perforated steel false bottoms to facilitate drainage and removal of cook liquor. After a digestive charge has been blown into the wash pan, it is allowed to drain for a short while before washing starts. This removes a portion of the cook liquor at full strength, usually about 11° Beaume. After draining, weak wash at 3 to 4° Beaume is sprinkled or sprayed over the top of the charge through a perforated annular pipe. Large volumes of weak wash are required and it should be applied at a rate corresponding to the flow of strong liquor draining away from the bottom of the pan. The weight of the effluent constantly decreases and when it approximates the Beaume of the weak wash, the latter is discontinued and hot water is run on through the same pipes until the underflow is down to zero Beaume. Displacement is not nearly complete at this point but although the fibre still holds appreciable amounts of valuable soda, the effluent is so dilute that it will not pay to evaporate and must be sent to waste.

Charges are usually from 5 to 6 feet in depth and the various wash liquors and wash water naturally follow lines of least resistance, channeling through the mass of pulp and often leaving large portions of the lot almost entirely unwashed. Soda pulp must be thoroughly freed from cook liquor before bleaching occurs. Consequently, it is evident that the requisite displacement of black liquor can be secured only by using excessive volumes of wash water. Pan washing dilutes the liquor about 4.5° Beaume in average soda mill practice and wash room losses of soda, including the losses in waste weak washes, probably exceed 90 pounds of soda per ton of pulp made.

Long exposure to the air is known to make soda stock harder to bleach if the stock contains black liquor when so exposed. Pan washing necessitates long periods of air contact, in fact, some mills hold their brown stock in the pans twelve hours and even longer. The length of time required for washing causes a heavy drop in the temperature of liquor sent to evaporators and this constitutes a serious additional charge against this method. Liquor coming from wash pans always contains a considerable amount of fibre and this is, in part, recovered in a clarifying tank, similar to a wash pan in general construction but of smaller size. The liquor passes directly to the evaporators from the clarifying tank and always carries an appreciable quantity of pulp in suspension. This is all wasted and worse than

wasted, since it fouls the evaporators, necessitating frequent shut downs for tube cleaning.

Diffuser Practice

Nearly all of the American and European sulphate mills wash their stock in diffusers. One of the larger Canadian Kraft mills uses a new continuous washing system, essentially a series of cylinder moulds each of which has a companion press roll, with counter current removal of strong liquor. The method has much merit and while infinitely superior to diffusion washing, uses an enormous amount of power and produces a comparatively dirty liquor.

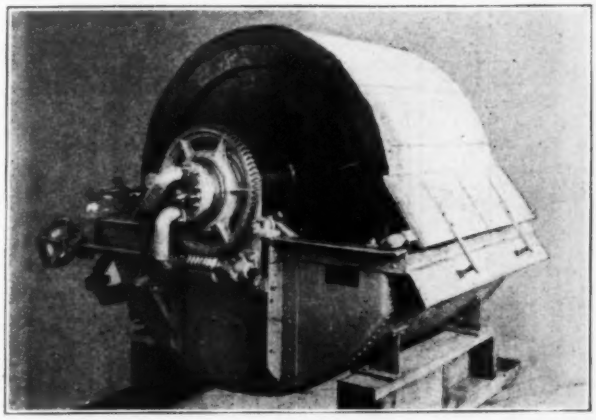
Mass washing by counter current methods in the diffusion battery eliminates air contact, decreases the wash period, maintains the liquor at high temperature, and decreases dilution of evaporator feed, as compared to pan washing. Diffusers are seldom used in soda mills because they do not thoroughly wash the fibre and in addition, the work of the diffuser is decidedly erratic. Kraft pulp, on the other hand, is not bleached and aside from soda loss, first class washing is not essential. Kraft is often sized and colored and operators sometimes disregard the serious increase in consumption of alum size which results from incomplete displacement of soda salts.

Dilutiqn of cook liquor by diffuser washing probably averages 2.5 to 3° Beaume. If dilution is only 1° Beaume the reduction in evaporator load may be a doubtful economy, as it is probably at the cost of high soda loss in the washed pulp.

Bad cooks are the bane of the diffuser man's existence. Such pulp gives up black liquor only at a very slow rate and unfortunately there is no way of knowing in advance what wash rate will be realized. The operator can not see what is going on within the diffuser nor can he examine or inspect the pulp. His only guidance is the rate of flow and the Beaume of the liquor passing from one diffuser to another. Production must be maintained and in a big mill, having many diffusers, it is natural for a "raw" charge to be held in the diffuser and passed on to the relief crew. By "passing the buck" each shift escapes responsibility but the mill always loses.

Contrary to the much praised theory of passing liquor through a battery of diffusers against the pulp, under which system successively weaker wash liquor from other diffusers in the battery and a final hot water wash is used on each charge in turn, the battery system is not always or even generally used in mills which were designed to follow that practice. On the contrary, some important mills wash their cooked pulp by the separate batch method, operating each diffuser as a separate unit. In this way, they minimize the slowing down of the entire wash room by an occasional bad charge.

Diffusers reduce heat losses and decrease the evaporator load when compared to pans, but diffusers sometimes "cut" through and thus after washing is apparently finished, a large proportion of the batch remains but little reduced in cook liquor content. This is a well-known diffuser fault and there seems no way of correcting it. There is food for thought in the disquieting reflection that serious losses of this nature cannot be prevented and in fact, often occur without being detected. Careful observation of diffuser operation leads to the belief that no mill knows exactly what amount of soda is contained in the pulp leaving its diffusers. The charge cannot be accurately sampled, except after being mixed in water, and this is not commercially feasible, except where



many charges are mixed in a common storage tank of huge size. In practice, the pulp is commonly sluiced out by water under pressure and goes direct to the screens.

Foaming in the wet machines, with consequent fibre loss, direct indications of high soda loss and high alum consumption, as mentioned above, are both conclusive proofs of poor washing. Diffuser liquor is always dirty, that is it carries a great deal of fibre. Just as in pan washing, this fibre is wasted and also lowers evaporator efficiency by fouling the tubes. In Kraft and other sulphate mills, fibre in the evaporator feed causes foaming in the evaporators and additional soda loss results.

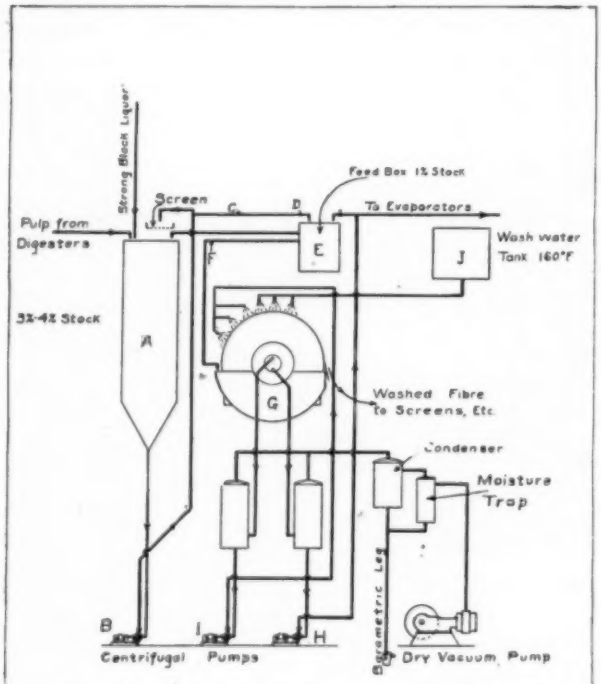
The increasing tendency toward manufacture of easy bleaching sulphate for competition with soda stock will put diffusers in a bad position in certain sulphate mills because good washing is vital to bleach economy.

Making due allowance for the difficulties of getting accurate samples, it is fair to say the soda losses, figured as sodium sulphate, certainly amount to 125 pounds per ton of air dry pulp produced. Some mills compute their soda loss at about 150 pounds and this figure may not be above the average.

Washing on Continuous Filters

Drum filters of commercial size have been washing digested pulp, treating the entire output in one instance, during a period of sufficient length to fully substantiate the high regard in which they are held by all who have given them consideration and drawn an unbiased comparison with the older methods.

Regulation of pulp density with provision for maintaining fibre ratio at approximately 1% by weight, in undiluted cook liquor and an arrangement under which the stock can be delivered to the filters at a temperature of about 160° F., can be best secured by close adherence to the flow sheet shown below.



PULP WASHING ON CONTINUOUS VACUUM FILTER

This plan has been in actual commercial use a long while and has proven most satisfactory. With minor modifications, to meet local or special conditions, it can be fitted into any flow sheet.

If the reader will carefully study the sketch, following each step in the process in the order given below, the technique of pulp washing on filters can be readily grasped.

The digester is blown into a tall cone bottomed tank called a "baloon" (A), which already contains a sufficient hot, undiluted black liquor to thin the charge down to a stock containing not more than 4% fibre, by weight. Before "blowing," stock pump (B) is placed in operation and is returning the stream of liquor drawn from the cone of the "baloon" back to the top of the same tank through bypass (C). Fifteen minutes of pumping, after the digester has been blown, is ample to thoroughly mix the charge and to insure that the stream returning through (C) will be of uniform density thereafter. Valve (D) is now opened full and a stream of mixed stock passes through a nozzle of predetermined capacity, under constant head, into the small mixing tank (E). It will be remembered that this stock is at about 4% concentration, much too heavy to handle on a drum filter. The first dilution of the charge in the "baloon" has accomplished two purposes—gotten the pulp into a homogeneous mixture and provided a stock that can be pumped and delivered to the mixing tank (E) at a uniform rate.

Since proper filter feed contains only 1% of fibre, additional dilution with strong cook liquor must precede filtration and this is accomplished by passing sufficient black liquor from the line which carries the finished filtrate to the evaporators, into the mixing tank (E). This liquor is delivered through an outlet the size of which has been determined by experiments. This liquor is under constant pressure and dilutes the stream from the "baloon" to the right consistency for best treatment on the filters. Accordingly, the stock which flows from the mixing tank by gravity, through the overflow pipe (F) into the filter tank (G) has been thinned to the proper density without serious temperature loss, the enormous tankage required to dilute the pulp in a single step has been obviated, and most important of all, this is automatically accomplished in such manner that variations in either density or rate of flow will be trifling and, due to the great flexibility of the wash filters, results will be unfailingly satisfactory.

On filter (G) the filtrate is separated into two fractions—undiluted cook liquor is drawn out through the lower portion of the automatic filter valve through a vacuum receiver and centrifugal pump (H) and sent by the latter direct to the evaporators. The rate of flow, Beaume and temperature of the stream are all constant. Liquor at about 3° Beaume is drawn from the upper segment of the filter valve into a corresponding receiver and centrifugal pump (I), by which it is returned to the cake on the filter drum, through perforated distributing pipes as a first wash, to be followed by clear water wash at about 160° F. The latter is delivered to the cake through suspended perforated drip pipes under gravity pressure from tank (J). The adjustable parting bridge in the valve is set so that the weak liquor wash displaces the strong liquor then contained in the pulp cake and the weak liquor is in turn displaced by hot water. Wood pulp washes at a rapid rate when under high vacuum; when spread as a thin sheet over a porous filter medium the above counter current system of washing effects an almost complete displacement of cook liquor while dilution by washing does not exceed 0.5° Beaume.

The drum, which is divided into sections of equal size, turns at 1 revolution per minute. During operation, about 1/3 of the filter area is submerged and vacuum at 18 to 20" is maintained over the entire surface, excepting that no vacuum is carried on the section being discharged nor on the ones which have been freed from cake but have not yet submerged. During the submerged or cake forming portion of the cycle, black liquor is drawn through the monel cloth

and fibre previously contained in this portion of liquor forms a smooth even cake about ¾ inch thick, which adheres to the cloth and after a brief drying period passes under two lines of drip pipes, which deliver weak liquor wash upon it. This first wash is evenly distributed over the fast moving cake and vacuum draws it into the fibre. The strong liquor contained in the original cake is thus displaced and added to the strong liquor filtrate. Little or no diffusion occurs in a fibre cake, the action being almost entirely one of displacement. Just at the completion of this preliminary wash period, the fibre passes the parting bridge in the filter valve and then passes under three hot water drip pipes. The action as described above is repeated here and water displaces the weak liquor then representing the moisture in the stock under treatment. Filtrate from this portion of the cycle passes through the upper outlet of the automatic valve to the weak liquor receiver and is pumped back to the first or weak liquor drip pipes, so that it is correct to say that the wash water passes twice through the fibre, before any of it can be included in the finished filtrate going to the evaporators.

Washing having been completed, there follows a short drying period which leaves the cake with about 80% moisture when vacuum is automatically released on the section just as its lower edge reaches the "doctor." The cake slides off over this deflecting apron and after being repulped by mechanical mixers or under water jets is ready for screening.

Pulp leaving the filter averages only 13 pounds of soda per ton bone dry basis and since no liquor is discarded during the process, this constitutes the only wastage that can be charged to the wash room. Filtrate is practically free from even traces of fibre and there are no losses due to foaming in a well-planned installation.

Stock travels through the filters at a very rapid rate—a six-ton digest is washed in one hour on 500 square feet of filter area—consequently the rate of washing is much faster than by any other system. This favorably affects the bleaching factor and by comparison with pan-washed soda pulp, it is proven that the same stock consumes about 1% less bleach if washed on drum filters.

Filter Advantages

The preceding table brings out certain points of superiority enjoyed by the automatic continuous vacuum drum filter, but they can not all be stated precisely, although self-evident to any thoughtful operator. The following enumeration of the most obvious merits of the new method is offered as an effort to answer various questions which will naturally occur to any reader who has not seen the filters treating pulp.

1. Dilution of evaporator feed liquor is reduced about 35% in a soda mill and about 20% in a Kraft mill.
2. Wash room labor decreased about 60%.
3. Soda losses are at least 75% less than in either pans or diffusers.
4. No fibre lost in evaporator liquor and no shut downs for cleaning tubes.
5. Evaporator liquor is maintained at constant temperature and density and is delivered to the evaporators at a uniform rate of flow.
6. Truly representative samples of washed pulp on which dependable soda loss figures are readily determined, are easily secured.
7. All operations are in full view, always subject to inspection.
8. Time of pulp in process is enormously decreased.
9. Thin sheet washing, positive contact of wash liquor and wash water thru even distribution upon the pulp, results in a nonvariable displacement of cook liquor throughout the mass of fibre treated.

COMPARISON OF THE THREE SYSTEMS OF BROWN STOCK WASHING
(Note—Throughout this article all Beaume readings are reduced to 60° F.)
TABLE NO. 1

	FILTERS		WASH PANS	DIFFUSERS
Basis one ton bone dry pulp	Soda	Sulphate	on Soda	on Sulphate
Wash Water used—gallons	1085	1205	3615	2890
Dilution Evap. Liquor—°s Be.	0.5	0.8	2.5	4.5
Temperature Evap. Liquor—°s F	150	150	110	160
Total Wash Room Soda Loss—pounds	13	35	90	125
Bleach Used—%	12-16		14-20	
Alum Size Used—pounds		20-30		50-75
H. P. for Washing and Evaporating	5½	6	10	7½
Annual Depreciation of Plant—%	10	12½	15	20
Labor Cost (basis 100 tons) daily—$	0.16	0.16	0.60	0.36
Comp. Costs for Heating Wash Water—$	0.05	0.06	0.16	0.13

10. Installation costs less than for either diffuser or pan stations.

11. Capacity, basis bone dry pulp washed, is extremely high. A filter with 100 square feet cloth area (drum 5′ 3″ diameter by 6′ face) handles 25 to 30 tons in 24 hours.

12. Filters operate automatically, thus eliminating the irregularities and losses because of the personal equation of the older systems.

13. Bleach consumption reduced 1% or more in a soda mill and alum size loss correspondingly decreased in Kraft pulp before coloring.

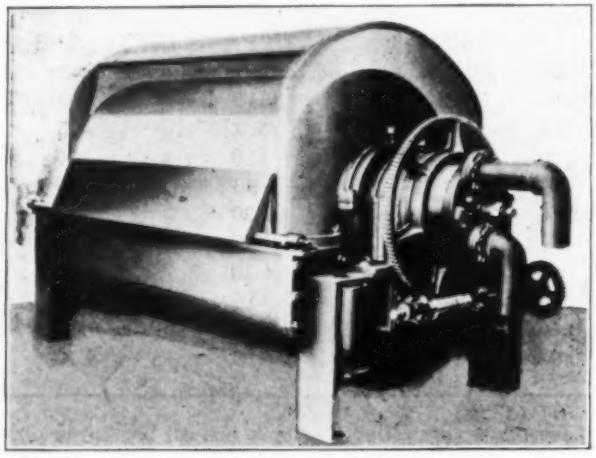


TABLE NO. 2

Filter Equipment to Wash 100 Tons Kraft Daily

Filters—200 sq. ft. each	$15,000.00
One vacuum pump — belted type — 2,000 cu. ft. displacement per min.	5,000.00
Centrifugal pumps — includes pulp mixing pumps	1,500.00
Vacuum receivers, condensers and moisture traps	2,500.00
Vacuum and liquor pipes and valves	2,500.00
Tankage for pulp mixing	6,000.00
Total installed cost	$32,500.00

TABLE NO. 3

Operating Costs Per Ton of Kraft Washed

Power at $5.00 H. P. month	$1.83
Labor at 50 cents per hour	.16
Supervision, etc.	.01
Repairs and renewals	.01
Interest at 6%	.06
Depreciation at 12½%	.13
	$2.20

Filters in the Ultimate Pulp Mill

Although this article is primarily intended to briefly outline the technique of vacuum drum filters when used as brown stock washers, it seems not inconsistent to mention a few of the many other ways in which this new tool promises to serve the industry.

Extensive experimental work, conducted on a commercial scale under actual plant conditions proves this machine to be the real "super" save all. It recovers more than 90% of all the fibre contained in white water and handles half a million gallons of water on 100 square feet of area per 24 hour day.

Filters of bronze, antimonial lead and wood construction, with phosphor bronze wire cloth, are expected to show wonderful efficiency as bleach washers.

The usual type of wet machine with its expensive felts has small chance to compete against drum filters for making laps. The filter sheet is about 80% wet and can be carried one inch thick. This sheet is strong enough to pass thru press rolls or the rolls can be fitted to the filter drum. It will require further work to perfect this idea but it is feasible.

Washing and de-inking of old paper stock is being investigated with every prospect of full success.

Many filters are in regular use recovering caustic from lime mud in the various soda and sulphate mills and they are much used in the filtration of clays, starches, satin white, barytes, gypsum and like materials, the manufacture of which are incidental steps in making coated and other special papers.

Beyond question these machines will be generally utilized by progressive pulp makers and many new uses developed as soon as their possibilities become better known.

The industry will be best served if the larger operators co-operate with the manufacturers to the end that this improved and cheaper method may be made available at the earliest possible date. A most energetic campaign of testing and experimentation is fully justified by the rich promise of the work already done.

Summary

It is clearly evident that the pulp makers of North America today stand at a parting of the ways; manufacturing costs cannot be greatly reduced unless radical changes in the process are introduced. We have been spoiled by several years of unparalleled prosperity during which the trade greedily absorbed every pound of pulp that could be produced and eagerly begged for more, and much of the output was of sadly inferior grade. Today the very best pulp, and none other, can find a buyer, and the margin of profit is very small indeed.

Many of the most experienced pulp men in America have endorsed the use of continuous vacuum filters for brown stock washing, several installations have been made and others are pending. Undoubtedly costs will be lowered while the grade of the product is raised. There is nothing uncertain or indefinite about the new method and it has every indication of being a genuine innovation—possibly the greatest forward step during recent years.

Six Definite Things That Workers Want

3—To See the Wheels Go Round

By JAMES H. COLLINS

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AT the peak of war production, a New England plant began paying its employees a bonus of one week's wages every three months, with two weeks' pay at Christmas. Every time the bonus was slipped into pay envelopes a letter went in, too, speaking of business conditions. Thus employees understood that this extra money was not a gift, but extra earnings, their dividend on good times.

When depression came, employees felt that the bonus must stop. To their surprise, there was an extra week's pay when the next bonus day came round. This time, however, the letter speaking of business conditions explained that, as the mill had only been working two to three days a week for several months, an early reduction in wages would be necessary. The reduction was accepted without protest—everybody knew that it was inevitable, caused by outside business conditions, beyond the control of the management.

The large number of employee periodicals published by business concerns throughout the United States is sufficient proof that workers like to know what is going on in the organization of which they are a part. They want to see the wheels go round. Such periodicals print pages of personal items that serve the same purpose as the items in the country weekly. But there is even keener interest in solid articles about current business conditions, company policies, technical equipment and methods, the work of different departments. In a widely scattered organization like that of a telephone corporation, for example, the worker in the accounting department may have little opportunity to become personally familiar with the people and methods in the operating or wire chief's rooms of the many exchanges, the routine of long-distance traffic, the repair department, the gangs that erect new lines across states or first sleet damage. Yet through their employee magazines, telephone people keep track of the service as a whole, are better fitted for their own work because they understand something about the work of others.

Workers in a certain eastern organization have a spirit that can be illustrated with a story. A customer persuaded one of its girl stenographers to become his secretary, at an increased salary. In a couple of weeks he came in and said she was homesick for her old associates, and asked if she might be taken back, a request that was granted. This organization has an atmosphere of friendliness and service—even the fifteen-year-old office boys show it in their alert courtesy to strangers. That spirit has been created largely by showing, through the printed word, opportunities for advancement—the personal stories of men and women who have risen as they learned different branches of the company's work and developed personal ability. The wheels of promotion are purposely kept in plain sight.

Not every business concern is large enough or rich enough to publish an employee magazine—certainly not of the kind issued by one middle-western manufacturing company, which is said to pay its "house organ" editor $10,000 a year. Apart from printing and paper costs, writing and editing such a periodical involves a great deal of work. But there are other ways, involving little expense, by which employees can be given information about a business—slips in pay envelopes, announcements on bulletin boards, talks at employee gatherings, special exhibits that visualize, exhibits that make information visible.

During the difficult downward adjustment of wages, when pay envelopes were shrinking two ways—in wages per hour, and the number of hours' work—the personnel director of an eastern factory used a simple device to show that the cloud had a silver lining. Wages were falling, but the cost of food, clothing and other items in living expenses was falling, too. Taking wages in that plant, and the government's commodity-price figures month by month, he showed by two thermometers that, while wages had dropped 20 percent in a year, the purchasing power of a dollar had risen a little more than 25 percent in the past six months. By changing his thermometers each month he set employees thinking of what the economists call "real wages" instead of dollars—the purchasing power of the money they earn.

There was considerable carelessness among the employees of another concern in using supplies—little things like thumb-tacks, clips, twine, wire. One night the junk and sweepings of the plant were turned over to the purchasing agent, who sorted out different things, tagged them with the prices he was paying for each article, and arranged them in an exhibition. It was an interesting show. Some fellow had tied up a package of rubbish, thinking he was helpful. But he had tied it with sixty-five feet of good copper wire, worth not less than fifty cents! Another package was tied with a special kind of thread worth two dollars a pound. Screws, bolts, nails, small tools and the like, all fit for use again, had been swept up from the floor. One practical way of saving such things was indicated by two tool bags. Sloppy Sam's tool

bag had everything jumbled together so that nothing could be found, while the contents of Orderly Otto's tool bag were shown as he sorted the different things out every night, and packed each where he could immediately put his fingers on it.

Every employer has some information by which to estimate current business conditions, forecast the future and plant output. He may know that six months hence the work force will be decreased. He is already trying to make the shrinkage as small as possible. Employees might help in a half dozen ways if they knew—economy of materials and time, attention to quality, more intelligent teamwork. But lacking knowledge about conditions, and fooled by present activity, they may be thinking about a wage increase—"Aw, the company's rich, and can stand it!" Put in simple diagrams, the Old Man's data, the footrule he puts on business conditions, would be interesting to employees and give them a viewpoint based on facts.

Giving employees better information about the business will correct much misunderstanding about their personal interests—concrete things like wages and hours, which they see close at hand. Better information is even more effective in creating better understanding between different departments, and taking up expensive slack.

When readjustment loomed up, Henry Ford found that he would need forty-odd million dollars to meet early obligations. Wall Street discovered it, too, and hurried to suggest a loan. Mr. Ford declined to borrow, closed his plant down six weeks for an inventory to find out where he stood, and raised the money by cutting out inter-departmental slack and stimulating teamwork. There were ninety-three thousand finished automobiles on one hand, and a sales organization capable of increasing its activities on the other. When the sales force knew what was necessary, it sold the cars. There was a war-swollen supervisory organization of desk men. The desks were sold, and the men offered production jobs in the factory. Mr. Ford owned a railroad by which, through quickening the traffic in both raw materials and finished cars, he cut down the material and finished product investment nearly $30,000,000. Had these drastic changes been attempted without letting employees see the wheels, there would unquestionably have been misunderstanding and opposition. By making the whole situation plain to everybody, there was such teamwork that the labor and overhead cost of building a "Tin Lizzie" dropped nearly ten dollars a month during the next six months.

After making a study of two hundred employee publications, Professor Robert E. Park, of the University of Chicago, says that while most of them seem to be edited for the employer and at the employee, yet their publication assumes that the relation between employer and employee is not one of mere money, and that there is nothing that so satisfactorily ameliorates between employer and employee, and maintains morale, as a well-conducted employee publication. This conclusion may be broadly applied to all honest information given employees by employers, by whatever method distributed. The remarkable increase in such information is not wholly voluntary on the part of executives—it grows because there is a genuine employee demand for it.

Fastness of Dyestuffs

By PAUL DE GUEHERY

A CONSUMER of considerable quantities of paper for a certain special purpose, which does not require a detailed discussion at this place, recently informed me that his customers in turn were complaining to him about the quality of his product, stating that the color of the paper used in the conversion process was not "fast." As under normal conditions papermakers term a color "fast" when implying its permanency to light, I most naturally assumed, that in this particular case, also, the fastness to light was the cause of objection. But it was quite to the contrary. After some discussion and explanation I finally discovered that the fastness to light was of no importance whatsoever, but that this paper was required to be fast to washing, it being subjected to a special treatment during the conversion process.

In the first place the consumer and buyer of this paper made the mistake of not giving the proper specifications for his product, and, secondly, the manufacturer made the mistake of not asking for these specifications, simply being contented with having obtained the order. Furthermore, with his deplorable lack of knowledge of all matters pertaining to the dyeing of paper, he considered this part of the manufacturing process of paper as too unimportant to pay much attention or to lose much time over. The result was, that his product was not satisfactory.

While such an extreme case as this does not happen every day, still it actually did happen and probably does happen much too often.

Speaking of fastness of dyestuffs, or of fast dyes, became more or less a general habit without any comprehension as to what it really means since the cessation of the importation of dyestuffs from Germany in 1914, and the inferiority of the then available sub-

stitutes was blamed on the American manufacturer and not on the product. The simple and pure statement that a dyestuff is "fast" means absolutely nothing, unless it is given in relation to some outside influence acting on the dyestuff, such as the action of light, acid, alkali, heat, washing, perspiration and other sources.

A very good little article on this subject was published in a booklet issued by one of the leading dyestuff manufacturers at the time of the Chemical Exhibition of 1920. It might prove to be of interest to repeat it here:

(By courtesy of the author, Mr. Giles Low)

What Is Fastness

Fastness is the most abstract, evasive and meaningless term of all that are ever used in connection with colored materials. Yet it is the first and usually the only thing the layman asks about: "Is it fast" or "Are all these colors fast?" or something to that effect.

The person who is initiated into the intricacies of dyed goods always words his question with a comparison to something he knows about as "Is it as fast as indigo?" Also he is specific in the dye or class he is asking about. You cannot intelligently ask "Are American colors as fast as German?" That is like asking if the Atlantic Ocean is as salty as the Pacific. The answer cannot be anything but "yes." Merely carrying a dyestuff a few thousand miles does not change its characteristics. As long as the molecule of a product is built of the same kind and number of atoms, it makes no difference whether you make it in Buffalo or Berlin, Carrolville or Frankfort, Ludwigshafen, Wilmington or Hongkong, China.

There are certain products which until recently have not been made in America. They were made in Germany. They stood the destroying action of light and washing to a far better degree than the most familiar American products but they are difficult and expensive to manufacture. They require crudes which are less plentiful, in some cases intermediates which were required for war purposes. So we have had to use the dyes which were cheaper, more plentiful but less fast in dyeing materials where the superior but less plentiful products would logically have been used. It has been like using glucose because sugar was not available. In some places it does very well, in others it cannot be used satisfactorily, but we would either have to eat unsweetened food and wear undyed garments, or resort to the makeshift which we did.

However, that condition is practically over. The line of fast colors is nearing completion and they are to be gotten in ever-increasing quantities so that the purchaser of dyed fabrics may be as particular now, if not more so, than in pre-war days in his insistence on properly dyed materials.

Because the public has become accustomed to less fast products and because the dyestuffs for them will be much cheaper, some unscrupulous dyers will continue to use improper dyes. All of the large concerns, however, and by far the majority of the smaller ones, are already availing themselves of the means of making their outputs superior. These new fast colors are naturally more expensive but with increasing demand, larger production will soon cut the costs.

The housewife need no longer watch the black run into her washtub from her stockings or the colors from her ginghams if the things she buys are products of reliable firms. She should insist that the retailer with whom she trades supply himself from sources where the work is handled in the proper way which is now possible. To return to the parallel, if her confectioner could get sugar and yet continued to use glucose, the housewife would trade elsewhere. The dye fastness situation is analogous.

While the foregoing is written from a textileman's point of view, it equally applies with but slight variations to the paper trade. Substitutes, and all other war-time concoctions, which not only faded over night but also as fast as the paper was made, need no longer and actually do no longer occupy the much troubled mind of the superintendent.

Fastness-to-Light

The fastness-to-light of a paper is not only determined by the quality of the particular dyestuff, but also, and not to a small extent, by the various pulps used, of which mechanical ground wood is the poorest and is the one showing the least resistance to light. The newspapers are a striking example of this. Unbleached sulphite, bleached sulphite, bleached rags are showing a gradually increasing resistance according to the grade of purity of the individual fibre caused either by the presence of impurities of natural origin or by chemicals left in the fibres after the treatment the various materials have to undergo during the different processes. The best raw material is the highly bleached pure new linen, properly and carefully prepared in every respect.

The selecting of the necessary dyestuffs for a certain paper must naturally be done in entire conformity with the other materials used and with the specifications as to the quality of the finished product. No sane papermaker will ever use indathrene colors for newspapers, or vice versa, highly fugitive colors, like basic colors, for an A1 ledger. In the first place it would mean waste of good dyestuff and therefore money, and, in the second place, it would mean the spoiling of the paper that otherwise would be perfect.

While it is understood that these two cases are rather extreme, however, for the sake of perfect understanding it is necessary to go to the extreme. There are numberless cases in between to which these principles can be applied.

By far too often an inferior dyestuff is used where a higher grade product ought to take its place, if the

necessary consideration and thought would be given the subject. The price of the dyestuff and with it the ultimate cost of the coloring material that is required for obtaining a certain shade of paper is naturally also to be considered and in fact plays an important role. But when the paper manufacturer uses an inferior dyestuff—in relation to the other materials used—to dye his paper, be it white or colored paper, he naturally lowers the standard of his product, and, in doing so, he is liable to force his merchandise down into a lower class than he actually intends to market it, and, if he does want to have his paper in such lower class, he just as well could have made a cheaper product right at the beginning and get away with it.

The effect of the fastness-to-light properties of a certain dyestuff is more pronounced in proportion as there is more dyestuff used in the formula. That is to say, the effect of the artificial dyestuff appears in proportion to the amount of the natural color or the pulp. In a newspaper the white—or what is commonly called "white" in this case—is obtained by mixing the natural yellow of the ground wood with some artificial violet, usually realized by a mixture of blue and red dyestuffs. The yellow color of the ground wood fibre is not fast to light, but highly fugitive and with the small amount of artificial dyestuff used will show its influence very clearly and after a very short space of time. No so-called fast dyestuff could improve in this instance the fastness to light of the sheet.

On the other hand, a paper colored with a greater amount of artificial dyestuff is apt to show the individual properties of the dyes to a higher degree than a white paper, as the amount of the natural color of the pulp would remain exactly the same and therefore its effect relative to the fastness to light would be decreased with increased amount of artificial dyestuff.

To illustrate the foregoing with an actual example: A paper consisting of 100 per cent ground wood shows a certain yellowish color in its natural state and the amount of this color shall be assumed, just for the sake of this example, to be equal to one ounce of dyestuff. Then is added one ounce of a certain artificial dyestuff—violet—and the mixture will result in a white. If the yellow and the violet were pure colors, that is to say **pure** from a colorist's point of view, they would produce a pure white, as they are complimentary to each other. As it is, however, they produce a dirty, greyish white. The amount of the two colors stands fifty-fifty and with it the properties, these colors confer onto the paper, also stand fifty-fifty.

If, on the other hand, 10 ounces of the same violet were used in the same paper as before, having the like amount of yellow equal to one ounce of dyestuff, it is perfectly clear without much further explanation, that the effect of this yellow stands back as against the violet in the same proportions in which their respective amounts are represented in the mixture.

It is furthermore also clear, that no matter how fast a dyestuff is used in such case as given above or how much of it is being put into the paper, the natural color is always "there" and cannot be eliminated. It will always show its effect and influence to a higher or lower degree. The fugitiveness of the yellow color of ground wood can be overcome and improved to a certain extent only by using dyestuffs with better fastness-to-light properties. But all papers containing such pulp will always fade. If the results are not satisfactory, a higher grade pulp should be selected.

Testing for Fastness-to-Light

The necessary testing of the various dyestuffs as used by the papermaker is a very important factor and worth consideration. As most all dyestuffs are liable to change and to show different results when varying one of the many steps during the process of manufacturing the paper, it is absolutely necessary that when testing a certain dyestuff for its fastness-to-light these tests are always being made in comparison to some other product of known properties. Great care must be taken that the respective dyeings of both dyestuffs are of the same strength, made on the same pulp at the same time, under the same conditions. The least variation is liable to cause a difference in the effect when subjected to the destroying action of the light.

It is advisable to select for testing the various dyestuffs that kind of pulp to which the particular dyestuffs have the best affinity. That is, as a rule for basic and acid dyestuffs, a pulp containing approximately 50 per cent ground wood and 50 per cent unbleached sulphite, for direct and vat-dyestuffs, bleached sulphite, or, better, bleached rags.

The dyeings are then pasted on a stiff background to insure their laying perfectly flat and partly covered with black paper or a similar material, that does not permit any light rays to pass through. The best and most simple method to accomplish that is to employ such a frame as is used for making photographic exposures.

Then the dyeings are placed in such a position as to allow them to absorb as many light rays from the sun as possible.

The best time to make these tests is between 9 a. m. and 4 p.m. during the summer months. On cloudy days no exposure tests should be made as they only would produce erroneous results. If more than one day is required to arrive at the point necessary to properly judge the results, it would be better to skip days which are cloudy and finish the test the next day that the sun shines, than to run the risk of obtaining results which are not dependable.

In testing a dyestuff for its fastness-to-light, the following rules should be strictly adhered to:

1—Make dyeings of the dyestuff in question in comparison to another dyestuff of known properties under absolutely the same conditions in every respect. Both dyeings must show the same strength of the shade regardless of the individual amount used in each case.

2—Place dyeings flat against a solid background.

3—Cover part of dyeing with a strong cover to make sure that no light rays can penetrate such cover and to insure a sharp line where the covered and the uncovered part meet.

4—Expose only against direct sunlight. There have been invented and are in use by a number of mills various artificial daylight lamps to make the dyer independent of weather and season for making his tests, but these instruments are very uncertain and do not give altogether satisfactory results. The particular rays that are most destroying in all the sunlight rays are the ultra-violet rays, and a lamp producing just these rays in the majority ought to bring the best results. But actual tests made during July on a clear bright day with various dyestuffs have shown that these lamps produce results that are under some circumstances misleading and therefore are not altogether dependable. The papermaker and consumer are mostly interested in what happens to his paper under conditions presented by the daily life and not under artificially constructed ones.

Fastness-to-Washing

The fastness to washing of dyestuffs relative to paper is not of such great importance as it is in the textile trade, but nevertheless, it is more important than some people think—even if they are papermakers themselves. Outside of special requirements for certain converting processes or other special purposes, one well known feature which has caused many a complaint and rejection of goods, is partly due to the fastness-to-washing of the dyestuff. That is the two-sidedness of a sheet of paper. Besides some other mechanical influences, that enter also into the game at this point, a dyestuff that is not fast to washing will never produce a satisfactory sheet. Whereas a dyestuff that is fast to washing, will, when properly and carefully dyed, help to bring the paper to the desired standard. The paper manufacturer using such dyestuffs has at least eliminated one objectionable feature and can then direct his attention towards other mechanical troubles. As in later years the suction roll is gaining more and more friends, these considerations are apt to play a bigger and more important part every day.

As a rule, acid dyestuffs are not fast to washing, whereas basic, direct and vat-dyestuffs show an increasing fastness. Just what dyestuff, however, is suitable for a certain purpose remains to be a problem to be solved whenever occasion arises.

During the war and in after-war years, the fastness-to-washing of dyestuffs suitable for the manufacture of paper has gained more and more importance through the manufacture of papercloth. But this subject is sufficiently large and interesting to discuss it in a separate article.

Fastness-to-Alkali and Acids

Most all dyestuffs are fast enough to both alkali and acid, to resist the alkaline reaction of the size and the acid reaction of the alum. There are but a very few exceptions such as Benzo-Purpurine, Paper Yellow, Metanil Yellow, in which cases special care is to be taken during their application.

Fastness-to-Heat

The fastness-to-heat of dyestuffs relative to paper is also of great importance, as in the course of its manufacture the paper has to undergo a rather severe drying process either by machine drying alone, or by both machine and loft drying.

Some dyestuffs change permanently through the action of heat, some others only temporarily, and it is the latter feature, that is often very irritating and annoying, especially when matching new shades. For instance a paper might change from a greenish brown when taken off the machine to a reddish brown a couple of hours later. There is no way to overcome that, not even artificial cooling will give the desired relief. The only thing to do is to study every individual dyestuff under the various conditions they are subjected to, and to draw the conclusions according to the experience gained.

Fastness-to-Perspiration

The fastness-to-perspiration is closely related to the manufacture of papercloth and should find space in such an article.

A Grinder Room Improvement

ONE of the employes of the Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis., has adopted a method for handling the vertical doors on wood pulp grinders, that should have the effect of saving many hands and fingers from being mutilated.

He has rigged up a counterweight for these doors, which makes raising them comparatively light work, and also eliminates the danger of the door dropping out and clipping off an occasional finger or hand. The device is so simple that it is nearly impossible to get out of order—it including two pulleys and a counterweight, just a trifle lighter than the door. A rope, attached to the weight, runs up over the grinder, through two pulleys, which makes the raising of the door easy.

"Rheumatism is an infection not to be cured by a buckeye in your pocket—you can't get the Safety habit by carrying a horseshoe," says the National Safety Council.

The Steel Belt Conveyor

Handling Pulp Wood, Coal and Other Materials by Means of Steel Belts and Cranes

By HARRY CARLSON

IN a recent engineering publication the following statement was made: "By means of belt conveyors large carrying capacity is combined with low power consumption. Belts usually take 50 percent. of the power used by other conveyors, so the problem of the engineer is really to see whether or not belt conveyors can be employed, as all things are in their favor." It is evident from this that belt conveyors are recognized for their efficiency, and a careful study of industrial conditions reveals the fact that they have been extensively used.

When a belt conveyor is mentioned, it is natural for the engineer to picture in his mind a canvas, balata, or rubber belt, because of their universal adoption. To speak of a steel belt conveyor immediately brings one into a foreign field and questions arise because of the fact that they have not been used in this country. The following facts are presented as the result of an extensive experience in the field of steel belt conveyors and they should be of interest to pulp and paper manufacturers.

The Sandvik Steel Works in Sweden, having had a wide experience covering about thirty years in the cold rolling of steel, began about twelve years ago to make a steel belt to be used for conveying purposes in the various phases of industry, and it has met with decided success.

This flexible steel belt is made from the very best Swedish charcoal steel with a percentage of coal about 0.65, cold rolled, hardened and tempered by a special process. It is especially suitable for conveying sharp or abrasive material, which rubber and fabric belts cannot handle satisfactorily. The advantages of the steel belts over apron conveyors and wire woven belts are the elimination of heavy maintenance costs, power consumption and the spilling through joints and interstitches.

The steel belt has an especially hard, smooth and dense surface, which accounts for its great durability and high wear-resisting qualities. The belt, when installed as a conveyor with standard size pulleys, is subjected to a working stress of 28,000 to 30,000 pounds per square inch when traveling over the pulleys.

In the pulp and lumber industries all over Scandinavia, where these conveyors are extensively used, the steel belts often run in the open air, subjected to the influence of rain, snow and sunshine, and have always been found to work exceptionally well. The coating of rust that appears when such a belt is idle does not penetrate, but forms a thin film that protects the steel from further injury. When the belt is not in use for a considerable time, it may be found advisable to have it coated with a rust preventative.

Carrying Capacity

As compared with flat rubber belts of the same width, the steel belt possesses greater transverse rigidity and therefore a higher capacity, as the edges, even with a one-sided load, do not yield in a downward direction. This allows a relatively broader part of the belt to be used for carrying the load. These attributes are obvious and are due to the fact that the steel belt is less flexible than the textile fabric. As a result of the unavoidable vibration in a textile belt while running, the material conveyed has always a certain tendency to spread, and therefore the width of the loading area in most cases can not exceed about one-third of the width of the belt, whereas, in the case of a steel belt, two-thirds of the width may be used without danger of spillage, on account of the fact that it runs so smoothly. This fact is also partly accounted for by the greater rigidity of the steel belt, which allows greater distances between the supporting rollers, and thus less disturbance of the material in a state of inertia.

A special feature is the remarkable ease and simplicity with which material can be discharged at any desired point along the conveyor without the use of cumbersome and expensive trippers. The belt does not stretch and the tension devices are therefore very simple, as they only have to take up trifling variations in length, caused by changes of temperature.

Through intimate co-operation between the rolling mill, laboratory and technical men frequently in touch with customers, the manufacturing methods have been steadily improved and the steel belt can now be obtained in one-piece lengths up to 300 ft. for a width of 16 in. and a thickness of 0.035 in. The lateral deviation does not exceed 0.03%.

Figure 1 shows a steel belt 285 feet in length, 16 inches wide and 0.035 inches thick, weighing about 550 pounds—cold rolled, not polished or treated in any way, hardened and tempered only. Before delivery all belts are carefully examined both as regards quality and straightness.

Two Types of Conveyors

The steel belt conveyer is designed in two ways, either with the conveying strand sliding on a wooden support, sometimes fitted with skirting boards,

Figure 1

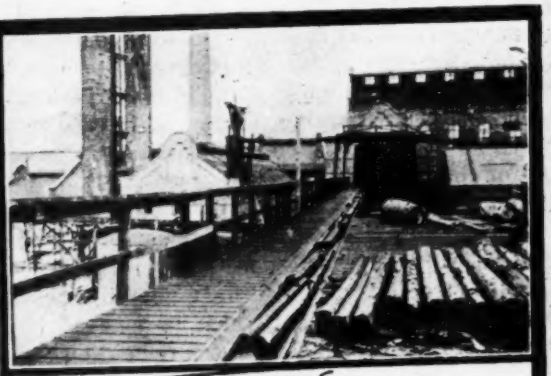


Figure 6

Figure 4

Figure 2

Figure 3

Figure 5

trough-like, the return strand being supported on idlers, or else both strands of the band are carried on rollers in the usual fashion. The sliding type, with or without skirting boards, is extensively used in Scandinavian countries, especially in saw mills and wood-pulp mills, for carrying wood of every description, such as boards, logs, chips and saw dust, also largely for charcoal, etc.

Figure 2 shows a steel belt conveyor handling pulp wood from a battery of seven semi-automatic barkers. The speed of this conveyor is fairly slow, so that the wood can be inspected when passing a man in charge of a hand barker, by means of which he removes the portions of bark which in some cases remain on the log.

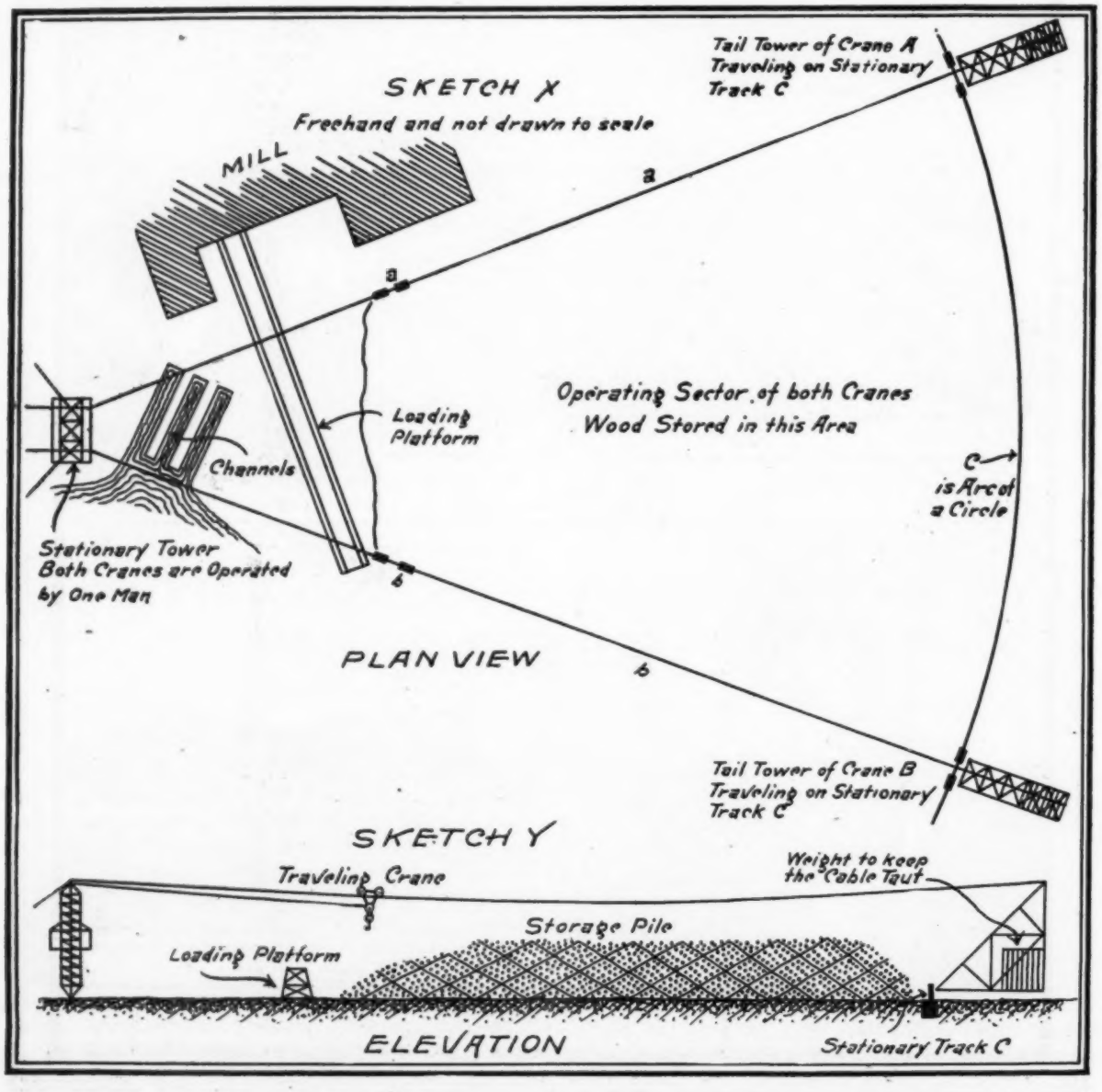
Unloading is effected over the end pulley into the chipper.

Two similar installations are provided in this part of the building.

Next to no wear is caused in this type, even for conveyors of considerable length, as the surface of the band soon acquires such a polish that the friction and consequently the power consumption is almost negligible.

In connection with heavy, hard and abrasive materials the roller supported type is preferable, the material being placed centrally on the belt and the edges left free, as is the general practice with flat band conveyors. Steel belts cannot be troughed like textile bands, which reduces their capacity for the same width, but this is partly compensated for since, as previously mentioned, a flat steel belt has a wider loading area.

In 1914 the Sandvik Steel Works erected a turbo-



electric power house of their own, to deliver electric energy for the whole mill in case the Näs Water Power Plant, which supplies the power for the works, should at any time fail. Reliability being the essential demand in this power house, the coal handling is executed entirely by their steel belts. Railroad cars are unloaded from an elevated track with storage bins, from the bottom of which the coal is carried to a feeding pocket and carried by means of a belt up an incline of 18° 30′ to the coal crusher and screening machine. Leather strips are riveted to the belt to insure sufficient capacity. See Figure 3.

Storing and Handling Pulp Wood

In American mills the pulp wood which does not go directly into the mill is stored after it has been cut in lengths of two or four feet suitable for the barking drums or machines. The storing usually consists of piling the wood by means of a cable conveyor or a portable stacker.

In the Karskaer Sulphite Mill, shown in Figures 4 and 5, the wood, as it comes to the mill in twelve foot logs, is handled in the following way: It is floated down the rivers into the mill pond and drawn into the three especially constructed channels. See Figure 4. In these channels, bundles consisting of about one hundred logs are formed by means of chains and traveling cranes. Then a double cable crane lifts these huge bundles and carries them as shown in Figure 5 to either the loading platform, Figure 6, for immediate delivery to the mill, or to the storage pile shown in rear in Figure 5. The logs are stacked with logs separating the different bundles so that the chain can be easily thrown around them to facilitate rehandling.

Figure 6 shows a "Sandvik" conveyor at one of Sweden's biggest sulphite mills. It shows the ease with which the logs can be rolled onto the belt and carried into the mill. The conveyor handles, in combination with a large cable-crane, the entire supply of pulp wood, the logs being taken out of the water (in Sweden almost all pulp wood is floated from the woods) in bundles, collected and chained by special hoists. They are then lifted and carried by the cable-crane to be discharged either upon the pile for storage or upon the conveyor loading platform for immediate transportation to the circular saws.

The center distance of this conveyor is 360 feet, half of the length being of the sliding type, where the loading is done, the other half being of the rolling type. The entire length of the conveyor is provided with steel sheet lined skirting boards.

The Cable Cranes

The construction and operation of the cable cranes (two in number) is very interesting. An operating sector, as per the sketch X, is covered. A section showing the construction and operation of cranes A and B and track C is shown in sketch Y. The two cranes travel on cable lines a and b. C represents the track on which the tail towers travel. It is thus possible for either crane to cover the sector shown, which is about 10 acres of area. The foregoing sketches X and Y are clearer and show in more detail the relation between the stationary tower, the tail tower and the circular track on which the tail towers travel, than words can describe. The operating of both cranes is done from the double stationary tower.

The conveyor carries logs from the platform, Figure 6, to the swing saws in the saw mill. The two-foot blocks are then carried to the barkers and the clippers, shown in Figure 2. The inspection takes place on this belt and blocks not entirely clean are picked up and rebarked on a hand fed machine.

Steel belts are used in several plants in Sweden for handling chips.

Engineering Applied to Manufacturing and Selling

By V. D. SIMONS

Address Before Annual Sales Conference of Seaman Paper Company, Congress Hotel, Chicago, January 4, 1922

PERHAPS the most important factor in the success of a sales organization, knowledge of its product and markets being taken for granted, is a deep personal interest in the success of the mills behind the product—a matter of engineering.

In a sense, engineering is the practical application of science to industrial and public progress; the application of mathematical formulae that science has deducted from natural laws.

In another sense, engineering is the art of producing the right article from the right material for uses which have economic justification; and hence, to the profit of all concerned and to the common good.

I have noted that in both senses, many connected with the Seaman organization are in fact sales engineers. Applying their knowledge of the product and producer, they analyze the customer's requirements and assist by recommending grades best suited to his needs. Specialists in different branches are frequently employed at considerable expense and sent to a mill to assist in the solution of some problem, a further evidence that their interest does not stop with the sale, and that active co-operation with the mill is the paramount thought.

In your line, as in all others, during the four years preceding 1921, quantity of output was the principal requirement. Quality was in many instances sacrificed to secure it. Cost did not need to be considered seriously. The demand was so great that the consumer would pay almost any price to obtain paper.

While the paper manufacturer may have received due compensation for his efforts during this period, it also carried with it penalties. The sudden shutting off of orders left the manufacturer with abnormal inventories and high conversion costs.

New conditions are such that production must be engineered along the most advanced and economical lines. Quality has to be re-established and cost lowered, and this is the big problem today, and it is an engineering problem.

Great strides are being made in this direction in almost all lines of industry, and some considerable advancement is being made in the paper field. This progress is not confined to the initial development of pulp and paper mills, but also extends to the management of the properties and the sales organization.

I became interested in steam and power requirements of paper mills thirty years ago when I was in the employ of the Bardeen paper mills at Otsego. During the last twenty years I have devoted my entire time to the study of these and other problems in connection with pulp and paper mills, and can testify to the fact that the most expert power engineers in the country are of little value to you unless they have a complete knowledge of what modifications in process, equipment and methods may render the highest practical operating efficiency. A knowledge of manufacturing details of the industry, the limitations of present methods, and the possibilities for improvement, are a part of the qualifications necessary for intelligent work in this field.

To illustrate the chaotic condition existing in the manufacture of paper, an analysis of conversion costs in ten mills making the same grade, varied from $17.00 to $28.00 per ton. No one of these is as low as it should be, and it is only a question of time when distress signals will be displayed by the mills having the excessive cost, unless immediate action is taken to place them in line to compete.

Variations In Power Costs

There is probably not more than 25 per cent difference in the cost of coal at the mills, yet the fuel item per 1,000 pounds of steam varies from 23 to 75 cents. Most any one of these mills would tell you that they had reduced the number of men employed to a minimum. Yet in one mill the labor cost per 1,000 pounds of steam is 4.7 cents, while in another it is 10 cents. The total cost of steam was 47 cents per 1,000 pounds in the lowest and 91 cents in the highest.

I am constructing a hydro-electric plant of 12,000 k. w. capacity in which we expect to secure the high efficiency of 89 per cent at the switchboard.

The coal in Washington is much lower in quality and higher in price than it is in the east, and I estimate that each added per cent of efficiency obtainable over and above the ordinary development meant more than $5,000 per annum.

I am revising a two-machine mill which is now purchasing $12,000 worth of power per month. When the proper application of generating equipment is made, I find the energy in a steam now being used for heating purposes is sufficient to supply all of the power requirements. Other changes in the process will cut the power requirements to such an extent that there will be an actual reduction in the present fuel cost as well as eliminating the purchase of power.

In the same mill there are 20 beaters and 60 men are employed to operate them. In the revised plant, a labor saving of nearly $5,000 per month will be made.

I am making a similar study in another mill, which is now purchasing considerable electric power. A careful analysis indicates that a modern steam plant will develop all the power and supply the necessary heat with a saving of nearly $100,000 per year.

In another installation, I will be able to reduce the power required by the paper mill from 31 h. p. to 18 h. p. per ton of daily capacity through a change in the process and a correct application of power. This change will not only reduce the cost of power, but of chemicals and labor, by an amount that would appear almost incredible, but which is nevertheless true.

I merely mention these figures to show the necessity for a careful analysis of all the factors entering into the manufacture of pulp and paper. It is apparent that leaks must be found and corrected. In some instances it will be necessary to revise the process of a department, and in other cases it may be advisable to discard the steam plant and build a new one along the most modern improved lines. In any event, it appears to be the time to ascertain what should be done to secure proper costs of production.

In the east the subject of super-power is receiving a great deal of attention. It is proposed to connect a great number of powers in New England and the Atlantic States by means of high tension electric lines. The inter-connection of power plants in this manner, with the subsequent savings due to leveling of peak loadings, and to economies of co-ordinated operation, will result in substantial savings. It is also proposed to supplement the power with large steam plants located at the mines.

In western New York it is proposed to tie up all of the water powers of the district with those of Niagara Falls. This feature gives some promise to the paper manufacturer, in as much as he will be able to purchase power at a very low price during the night hours for grinding of pulp, and in turn sell

hydro-electric power to the public service throughout the day, at a much higher price. Therefore, if the paper manufacturer has 5,000 k. w. to sell during the day, at say, 1 cent per k. w. hour, he could with this money purchase from 10,000 to 12,000 k. w. at night, which, added to his 5,000, would give him better operating conditions than he now has with his fluctuating power, and at lower cost. With the item of power cost almost eliminated, this district should be able to compete with Canadian mills having lower price wood.

Many relations between the elements of industrial problems which were for many years considered as nearly stable, have been violently upset, perhaps not to return to the old bases for years, if ever. I refer to such relations as between labor and material costs; to the advantage of industrial locations near sources of raw materials versus the advantage of nearness to population centers and markets; to the relation between the economy of hauling raw or finished materials over railways and highways. Rules of thumb in these respects, as well as the attitude of mind, and the easy financial returns of manufacturing which tolerated rules of thumb, are obsolete. Successful industries of the future are to be those whose problems are defined and worked out in advance of investment by scientific methods, which is only a way of saying that the results of experience and research must be applied in foresight rather than (as sometimes happens) in hindsight.

The message I wish to extend to the mill managers represented here is the vital necessity of adopting any feasible measure that will result in lowering of the costs; and also that now as never before, there exists the need of close co-operation between the production and sales organizations.

The Improved Lead Burr

By W. A. MUNRO

THE Improved Lead Burr that has recently been patented provides a means for the improvement of the quality in the manufacture of mechanical pulp, and at the same time maintains an equal or greater tonnage per stone.

This type of burr, as shown in Figure 1, has its teeth on one end gradually tapered inward and in this manner no abrupt shoulder is left at the end of the tooth, so that the rest of the tooth can freely enter and deepen the impression started by the tapered end without the liability of breaking out the edges thereof. Instead of the leading straight corner of the burr doing all the cutting of the pattern, and in its travel across the pulp stone breaking out the edges of the impression, and leaving a very rough surface on the face of the pulp stone, this new improved type puts the pattern on gradually, and brings it out as the burr travels over the face of the stone. This does away with rough spots and the breaking out of the cutting edges and puts a smooth print on the face of the stone.

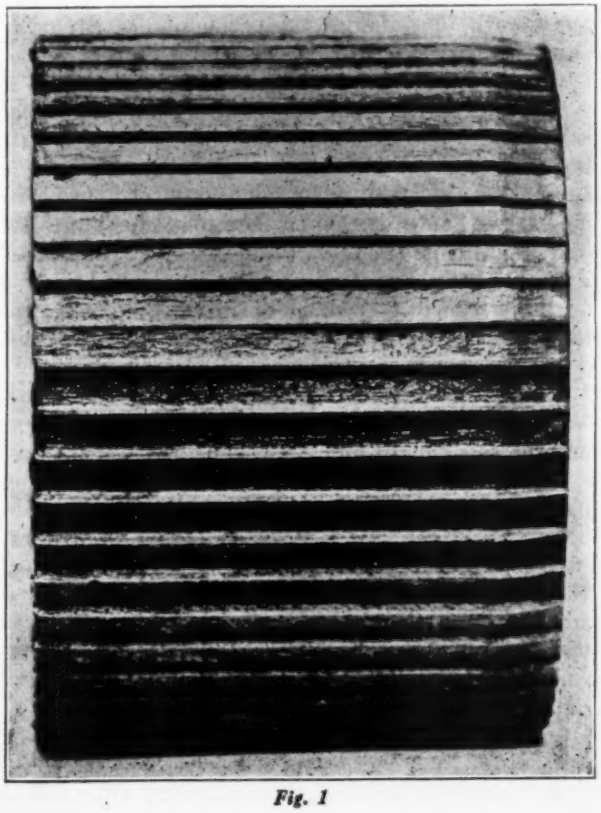


Fig. 1

Figure 2 shows the stone after being sharpened by the old style burr. Figure 3 shows the action of the Improved Burr.

Fig. 2

Fig. 3

In the case of the old type burr, the first inch of the burr did all the work of breaking out the pattern on the pulp stone, and the part nearest the shoulder wore down faster than the rest. With the new lead burr this never happens, but the whole face of the burr does its equal share of the work and in that way prolongs the life of the tooth of the burr, and hence the number of times that it may be used. In

one instance an Improved Burr was used 29 times before it was discarded.

Double patterning the stone or jumping the groove is very unlikely to happen with this burr. The inclined shoulder gradually enters the stone and the back part of the tooth acts as a guide for the cutting bevel and keeps the teeth in the proper impression.

The result of a smooth imprint that brings out the natural cutting particles of the pulp stone, minimizes the rough spots, and gives maximum stone clearance for the stock, is very apparent in the quality of the ground wood-pulp produced and in the yield obtained. The fibres by this lead burr are longer, finer, and above all more uniform.

Pointers on Purchasing Lubricants

By A. H. PRITCHARD

THE lubrication question in paper mills is a much discussed subject. The discussion usually runs to "Hello, Jack, how are you today?" "Fine day," etc., etc. "By the way, Jack, you use oil in your mill, don't you?" "Oh, yes." "Well, we have good oil at a rock bottom price; can't we get an order for a few barrels?"

And because Bill, the salesman, has shown himself to be a good fellow, Jack answers, "Sure, we'll give you an order; what kind of oil ya' got?" Bills says "Pink Oil, Blue Oil, Green Oil; what kind do you like?" Jack says, "I always liked Pink Oil; send me up a couple of barrels."

Do you think the above an exaggeration? Actually it may be, and yet the general line of conversation that occurs between the purchaser in the paper mill and the oil salesman is similar in principle to the above.

The question of oil purchases for a paper mill should be handled by an engineer or a man who has an understanding of engineering principles, because these principles govern the selection of the kind of oil and the recommendation of the correct lubricant best suited to the operating conditions in that mill.

Oil purchases can be handled from two viewpoints, viz.:

First—With the desire to secure the very highest type of service possible to secure in the mill.

Second—With the one thought of price per gallon uppermost in mind. Buying anything called "lubricating oil" at the lowest price possible, and with no thought as to the real service results obtained; in other words, is the purchase of lubricants handled in the same way as lumber, steel, cement, or any other commodity?

The man having the first viewpoint will give earnest consideration to the three engineering principles:

First—The possibility of reducing his friction load on the mill by the use of oils of the highest type. Under this same head he will give first consideration to the oil company that shows him they understand the types, construction, operation and lubrication of paper mill machinery. This latter fact will assure him of the recommendation of the right kind of oil from the list of oils, all of which oils are those having friction reducing qualities. For let it be known that lubrication engineering comprises a full knowledge of all the above facts, or briefly "the right oil in the right place."

Second—The man having the first viewpoint will consider his cost of maintenance and repair to his machinery in so far as it is influenced by the kind of lubricant used. In a small way this is tied up with the question of friction reduction, but not entirely. A bearing journal or gear tooth may not show exceptional wear, and yet there may be real opportunites to reduce the friction load on these same parts. In other words, satisfactory (so called) operation of machinery is no indication that the machine or machinery is running with the smallest coefficient of friction.

Third—The man having the first viewpoint will consider the question of the production of the mill. Can it be increased by the use of a correct lubricant?

Preposterous, you say at the first glance, but consider: Does speed have its influence on production? Does the quality of lubrication affect speed? Is production ever interrupted by hot and burned out bearings, broked down machinery, or replacement of worn parts? All these reduce production.

Does uniformity of speed play a part in building up production? A lack of uniform speed will certainly increase "broke" between the wet end and dryers or dryers and calenders.

Consideration of any one of these three factors will be well repaid when the subject of lubrication and the selection of lubricants is being decided.

Against these three very important factors, what has the man to consider who has the second viewpoint, viz., "The cost per gallon of the lubricant," with no regard for results other than to "keep her running"? This man is playing with a very, very small item, as compared with the three considered by the first mentioned man. This latter man is giving consideration to a cost which is insignificant as compared with any one of the other three.

A very liberal estimate of the latter item would be one-half of 1 per cent of any of the former items.

For you, Mr. Dubious, permit me to offer a spe-

cific instance of what was accomplished in one mill in the way of reduction in indicated horse-power. The only influencing factor changed was the kind of lubricant used.

The machinery I have in mind consists of a 34 dryer roll paper machine, 154 inch trim, basement drive, calender stacks, wet machine, Fourdrinier, winder and rewinder. All this machinery is being driven by electric motor. Using a well known brand of oil of the price-per-gallon variety, it required 214.37 horse-power to operate this equipment under full load and at normal average speed. When the correct oil was applied and instruments read, it was found the average horse-power necessary to do the same work was 192.43 horse-power—a net saving of the correct lubricant over the other of 21.94 horse-power.

This is one example of many, all of which run along the same lines. A horse-power per year costs between $75 and $100, which in the above case, assuming the lower value, shows a total net saving of the correct oil over the other for this equipment of $1,645.50 for power alone. The entire cost of lubrication for this equipment for a year was approximately $1,560, or, in other words, this paper mill owner secured his lubricants for this equipment for nothing, with $85.50 thrown in.

This owner was amply rewarded by his giving consideration to engineering principals as applying to lubrication.

How were such results accomplished?

Solely by the introduction and use of lubricants that permitted the machinery to operate with the least amount of friction at all bearings.

Then there is the buyer who purchases his oils on specifications, although this man is rarely met.

Those who have tried this method out have soon discovered that there is no specification covering quality. Specifications can cover physical characteristics such as are used in the refinery to check uniformity of product, but the friction reducing qualities of one oil as compared with another cannot be found except by comparison under actual operating conditions.

Oil manufacturers know that certain refinery methods, coupled with a careful selection of the crude oil, will produce a lubricant that has the greatest friction reducing qualities.

There is, however, a commercial factor involved with the refinery methods used. In one case, a high percentage of yield of burning oils is desired, in which case there is no selection or grading of crudes, and the lubricants obtained later; that is, after taking off the higher fractions, are a by-product.

In the other case, the sole idea of the manufacturer is to secure the highest possible quality in the lubricant, and no attention is paid to securing a high yield of burning oils, which come off in the natural way, and the crudes are carefully selected and graded.

With the latter case, it is a known fact that such lubricants do produce the lowest possible coefficient of friction.

Mr. Paper Mill Owner or Superintendent, these are facts which can be substantiated by an investigation. They are well worth your while to investigate, as the returns on your mill will more than pay you.

This question of oil quality is an all important one today, and one that vitally concerns you.

A few words with respect to application of lubricants to machinery in a paper mill. Correct application is also a part of the lubrication engineer's work, and only by an extensive knowledge and actual experience in paper mill lubrication does he find out the right way to apply the oil.

There are three benefits derived from correct application:

First and foremost is the positive feed of oil to the bearing, thereby keeping an unbroken oil film on the bearings, which in turn gives low losses in friction and prevents wear.

Second, with automatic devices installed, it is possible to reduce the labor cost of oiling. Such cost cannot be entirely eliminated, however, as even with the best type of devices some attention in the way of inspection and filling is necessary. It is possible to reduce such cost, however.

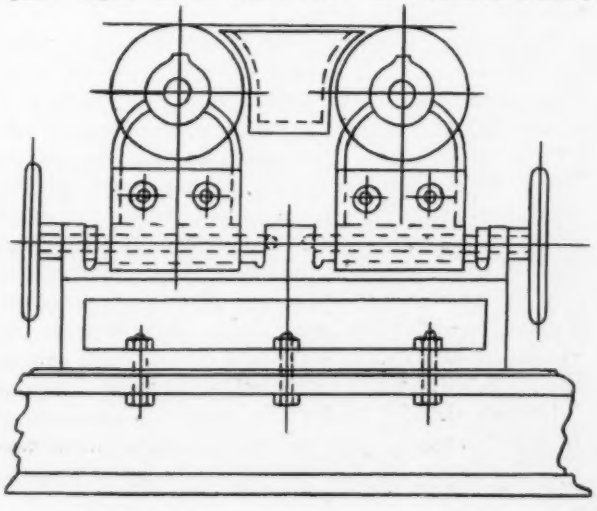
Third, and a very minor item, correct application saves the oil itself.

With such facts, and when I say facts I mean facts, before you, can you afford to neglect the lubrication of your paper mill? Not if you are a real executive and alive to the big benefits that may accrue to assist your competitor to undersell you on the market with a product of equal or better quality.

Carrying Rolls Over Suction Boxes

By JOHN A. KAGERHUBER

ON MOST Fourdrinier and cylinder machines, the wire or felt is carried over two or more suction boxes to remove as much water as possible ahead of the presses. The wire or felt is generally quite tight as it runs over the suction boxes,



giving it a constant drag which has a tendency to shorten the life of the wire or felt. It has therefore been found very practical to attach small carrying rolls on either side of the suction boxes, which relieve the corner drag and still maintain perfect suction, but the top of the rolls must be exactly level with the top of the suction boxes so that the proper action of suction will not be lost. As shown in the accompanying illustration, the roll bearings can be adjusted sideways and have slotted holes so that a vertical adjustment can also be obtained.

This arrangement is especially an advantage to mills where balsam wood is used and pitch gathers on the wire. This pitch is generally scraped off at the suction boxes, where it accumulates until finally the wire is lifted away from the suction boxes and the proper suction thereby becomes impossible. Without the carrying rolls, pitch is continually being scraped off at the suction boxes and lumped up or accumulated, and at times picked up again by the wire or felt, causing holes to appear in the paper.

Besides the foregoing advantage, the carrying roll will also prolong the life of the felt or wire very materially.

Paper Mill Increases Capacity by the Electrification of the Beater Room

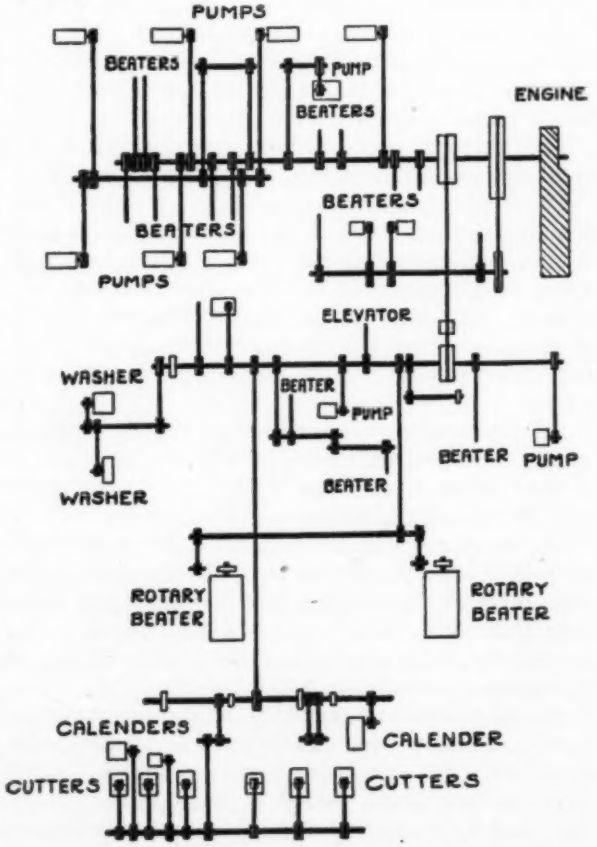
By H. E. WHITAKER
Ford, Bacon & Davis, New York City

SURPRISING increases in production are often obtained by the balancing of the various mill departments. One department can limit the output of a whole mill. A recent example of the results obtained in increasing production by the electrification of a beater room and thereby removing the neck of the bottle is outlined below.

The savings in the operation of the beater room due to electrification will pay for the cost of the change in less than two years, while it has increased the capacity of the mill at least 20%, thereby increasing the net earnings approximately 30%.

One of our clients has been making high grade paper for nearly seventy years. The product is known throughout the country for its quality and uniformity. The demand for it has been so great that it became desirable to manufacture every pound of quality paper possible with the existing equipment. An analysis of the situation showed that the beater room was the limiting factor in the production. It was the neck of the bottle.

The beater room contained eleven beaters of various makes and sizes, which were belt driven from three main line shafts, driven by a single cylinder condensing engine, which had been in operation for a period of 35 years. The accompanying illustration shows diagrammatically the arrangement of the main shafting. One piece of equipment has been added after another until the demand for steam had reached the capacity of the boiler plants, making the cost of maintenance high, and proper maintenance impossible under the conditions. Trouble with the numerous belts, pulleys, clutches, shafts, etc., caused the shut-down of the entire beater room at frequent intervals, thereby materially reducing the output. In order to adjust or repair a single belt, it was necessary to stop all the beaters until this work was done. The beater room basement was a conglomerate mass of shafting, pulleys, belts and piping without an inch to spare. Increasing failures of various parts of the engine helped to reduce production, and repairs on it became more and more frequent. It was seen that something would have to be done, and done quickly.



Previous arrangement of main shafting

The problem was placed in our hands and carefully studied. It was evident, for satisfactory operation, that new motive power would have to be substituted for the engine. At the same time the mill would have to be kept running at capacity while the changes were being made. It was found that electric power could be purchased from a nearby public utility at a rate that was well under the cost of producing it at the mill. A three-year contract was made for the purchase of electric power and work begun to electrify the beater room, using individual motors for driving the beaters.

The schedule of electrification was worked out whereby one new beater would be installed and electrically operated, and then the remaining beaters would be taken from service one by one and electrified. This plan was adopted and work carried out in co-operation with the operating organization of the mill.

The electrified beater room has been in operation for several months. Any beater can be used or shut down at the will of the head beater man, and it has been found that the service of the public utility has been free from any except momentary interruptions due to lightning.

The mill boiler plants have been relieved and much needed repairs made, the equipment being placed in a more efficient operating condition, making it possible to shut down some of the more inefficient units. A great quantity of shafting, belting, idlers, pulleys, etc., have been removed and the beater room basement transformed from a maze of moving machinery to a quiet, clean, usable space.

The cost of operation is approximately $50,000 per annum less than with the previous engine operation. The total cost of the change was approximately $75,000, not allowing for the salvage of the old equipment.

The capacity of the beater room has been increased 20 to 25% and is no longer the feature limiting the output of the mill.

Sulphite Mills Operated Without Coal

By G. HALLBERG
Pulp and Paper Mill Accessories, Montreal, Canada

APPARAT AKTIEBOLAGET, of Stockholm, Sweden, has been experimenting for several years with the problem of evaporating the waste sulphite liquor and utilizing the cendensate as fuel. Two complete plants are now in operation in Sweden, equipped by Apparat Aktiebolaget, and I give here below a translation of the report of tests made by Mellersta & Norra Sveriges Angpanneforening, consulting steam engineers, on the equipment installed at the Storviks Sulfit Aktiebolag, Storvik, Sweden:

Storviks Sulfit Aktiebolag,
Storvik.
Dear Sirs:

Investigation of the Evaporation of Sulphite Liquor for Fuel

Requested by you to make tests on the apparatus for evaporation of waste sulphite liquor installed in your mill, and to make tests on the heating value of the fuel thus obtained we herewith present our report of these tests, made by our Mr. Rogius, on May 10th-13th, 1921.

Description

The evaporation plant consists of two units, of which the first unit is intended for evaporation from 11 per cent to 30 per cent dryness, and the second unit is intended for evaporation from 30 per cent to 55 per cent dryness.

The first unit consists principally of the following equipment:

2 Heaters (surface condensers) of 232 sq. meter heating surface each.
1 Expansion vessel.
1 Gas washer with pump for milk of lime.
2 Centrifugal pumps, driven with electric motors, for the circulation of the liquor in the unit.
Various pumps and apparatus for intake and discharge of liquor from the unit as well as for discharge of the condenswater.

The second unit consists of the following equipment:

1 Heater (surface condenser) similar to above.
1 Expansion vessel.
1 Gas washer similar to above.
1 Pump, geared, belt-driven, for circulation of the liquor.
1 Centrifugal steam compresser, driven by electric motor, for the steam from the unit.
Various apparatus, etc., for the liquor and for the condenswater, similar to the first unit.

The liquor to be evaporated is taken into the expansion vessel through the feeding device, a floater which keeps the level of the liquor at constant height.

The liquor is carried from one of the chambers in the bottom of the surface condensers to a tank placed beside the unit. When the liquor has reached the proper concentration, it is drawn from this tank automatically, by means of a floater valve, the function of which is regulated in a simple manner by weights placed on the floater.

The circulation pumps carry the liquor through the tubes of the surface condensers three times.

Especially characteristic for this installation is that the evaporation is done by the steam evaporated from the liquor in the tubes and in the expansion vessel, the pressure and temperature of which is raised from about .025 kg. per sq. centimeter, resp. 100.7 degr. Centigrade, up to about .35 kg. per sq. centimeter, resp. 108.5 degr. Centigrade, and carried in around the tubes. When the steam is condensed against the cooler tubes, its steam producing heat is liberated and is transmitted to the liquor through the tubes for further evaporation. The condenswater is carried away from the units through ordinary waterducts at a temperature of around 100 degr. Centigrade, and some of it can be made use of as feed water for the boiler plant.

Two tests were made with the first unit which had been in operation about two weeks at the time of starting the first test.

This test gave a result of 9.24 cub. meter liquor evaporated per hour.

The purpose of the second test was to find out the capacity of the unit when filled with fresh liquor; it will be seen from the result of this test, 11.9 cub. meter per hour, that the liquor had dissolved the solids deposited on the inside of the tubes, which, undoubtedly, were there during the first test, thus giving a higher evaporation.

The emptying out of the old liquor and filling up with new, can be done in about 45 minutes.

Tests with the First Unit

Number of test	I	II
Date of test	May 11, 1921	May 12, 1921
Duration of test for measuring the condenswater	227′ 20″	300′ 32″
Duration of test for measuring the liquor	307′ 20″	.....
Volume in cub. meter of liquor going in	44	.....
Temperature in Centigrade of the liquor going in	70	.....
Percent. solids of liquor going in	10	10.8
Specific gravity at 20 Degr. Centigrade of liquor going in	1.050	.....
Cub. meter per hour of liquor going in, reduced to 11 percent. and 95 Degr. Centigrade	9.24	11.90
Percent. solids in evaporated liquor	30.9	34.9
Cub. meter per hour of evaporated liquor discharged	2.835	.....
Cub. meter per hour of evaporated liquor discharged, reduced to 30 percent. from 11 percent. liquor at 95 Degr. Centigrade	3.39	4.37
Kg. water evaporated during test	25570.5	39170.5
Kg. water evaporated per sq. meter heating surface per hour	14.55	16.86

Power Consumption

Compressor H. P. approximately	181.0	181.0
2 Liquor Circulating Pumps	37.1	37.1
Gas Washer	11.3	11.3
Circulating Pump for milk of lime	2.1	2.1
Pumping up the liquor	4.0	4.0
Pumping the condenswater	4.0	4.0
H. P.	239.5	239.5
Water evaporated in kg. per hour, per H. P., total	28.18	32.66
Water evaporated per H. P. hour, compressor work	37.3	44.1
Water evaporated per H. P. hour, circulation work	181.9	211.0

Tests were also made with the second unit and the following results were obtained:

Test with the Second Unit

Date of test	May 13, 1921
Duration of test for measuring the condensation	206 min.
Duration of test for measuring the volume of liquor	302 min.
Volume of liquor going in, cub. meter per hour	2.30
Volume of liquor going in, cub. meter	11.8
Volume of liquor going in, cub. meter per hour, reduced to 30% liquor at 90 Degr. Centigrade	2.13
Volume of evaporated liquor, cub. meter per hour	6.7
Volume of evaporated liquor, cub. meter per hour	1.34
Volume of evaporated liquor, cub. meter per hour, reduced to 55% from the 30% liquor at 90 Degr. Centigrade, as it enters	1.16
Percent. solids in the evaporated liquor	53.6
Temperature in Centigrade of the evaporated liquor leaving the unit	90.0

Power Consumption

Compressor, approximately	47.30 H. P.
Circulating Pump	28.00 H. P.
Gas Washer	10.85 H. P.
Milk of lime circulating pump	2.10 H. P.

Pumping up the liquor	2.00 H. P.
Pumping up the condenswater	4.00 H. P.
Motor for the lime mill	4.00 H. P.
Total	98.25 H. P.
Water evaporated, kg. per H. P. hour	11.92
Water evaporated, kg. per H. P. hour compressor work	24.8
Water evaporated, kg. per H. P. hour circulation work	41.90

According to stipulations made by the Government of the Province of Gefleborg, such measures shall be taken with the liquor discharged from your mill, that one-half of it shall be purified or in other way eliminated from the river alongside which your mill is located.

The total quantity of liquor produced is, according to testimonials, 4.096 cub. meter per ton pulp made. When manufacturing 26,000 tons per year, and with an estimated operating time of the evaporators of 8,400 working hours per year, this is equivalent to 12.7 cub. meter liquor per operating hour, the half of which quantity shall, according to stipulation above mentioned, be purified.

From the report given above, it follows that the second unit can handle 2.13 cub. meter per hour of 30% liquor, concentrated to 55%, which is equivalent to 5.8 cub. meter per hour 11% liquor to the first unit.

If the concentration is to be driven right up to 55% dryness, the required quantity—6.35 cub. meter per hour—of liquor can not be evaporated by the second unit, which, however, will be possible if one is satisfied with a concentration of 53.5%.

This lower percentage of concentration does not cause any inconvenience, as can be seen from the attached report; the heating trials reported on were conducted with liquor of a considerably lower concentration, and no difficulties whatever were encountered in burning same.

Consequently, the company can be considered to have filled the requirements stipulated by the authorities above referred to.

From the report of the **fuel test** can be seen that the efficiency of the boiler was very good, when one considers—not only the moisture content of the fuel but also the makeshift arrangements for the combustion of the liquor as well as the poor circulation in the boiler. With more suitable arrangements a still better result could undoubtedly have been reached.

The work of firing the boiler is very simple and, therefore, one fireman can look after a number of boilers.

There remains to be investigated how an installation of this size will pay for itself.

For such investigation a "heat balance" must be made up, in which consideration has been given to the manner in which the power, necessary for operation, has been created.

In this case we have two alternatives, leaving water power out of consideration, viz.:

1—Power, created by condensing machinery.

2—Power, created by compound engines with fully utilized discharge steam.

In both cases, coal with effective heat value of 6,500 heat units is thought to be used in the steam plant, and it is also thought that this plant works with a total efficiency of 80% for boilers and economizer.

In a plant in which the second unit has been added to sufficiently to handle the entire volume of liquor at about 11 cub. meter 11% original liquor per hour coming from the first unit the power consumption would likely increase to about 370 H. P. as against the 347.75 H. P. now required.

Power Consumption When Power Is Produced According to Alternative 1

Based upon the higher power consumption, which can be figured at 8 kg. per H. P. hour, the total for power, expressed in kg. per hour	296
Preheating the air from 95 Deg. to 100 Deg. Centigrade	16.5
To cover losses through radiation	7.5
Or total coal in kg. per hour	320.0

Upon the basis of the heat value of the concentrated liquor, which is 1700 effective heat units per kg. at 53.5% dryness, the quantity of coal of 6500 heat units per kg. which corresponds to 11.0 cub. meter liquor of 11% dryness, can be calculated.

$$\text{Thus, } \frac{11 \times 1.052 \times 1000 \times 11 \times 1700}{6500 \times 53.5} = 625 \text{ kg.}$$

If the above mentioned consumption of coal is deducted for power, there remains a profit of 305 kg. coal per hour—or per 11 cub. meter—original 11% liquor.

As 4.096 cub. meter liquor are obtained from each ton of pulp, the profit in fuel per ton pulp will be:

$$\frac{305 \times 4.096}{11} = 113 \text{ kg. coal per ton pulp.}$$

Power Consumption When Power Is Produced According to Alternative 2

Theoretically, 632 heat units are required for each H. P. hour. Add hereto radiation and other losses, and the total of about 850 heat units per H. P. hour is required.

If, as in alternative 1, we figure with a total efficiency of the boiler plant of 80%, we arrive at a coal consumption of 163 kg. per H. P. hour, or, for the total power consumption, 60.5 kg.

Add hereto, as in the first alternative, for heating of the air and for radiation, 23.7 kg., or altogether 85 kg.

The saving in this case will be 625 — 85 = 540 kg. per hour, or 11.0 cub. meter original 11% liquor, or per ton pulp, $\frac{540 \times 4.096}{11}$ = 200 kg. coal.

From yearly output of 25,000 tons of pulp one could, consequently, gain a net quantity of fuel corresponding to:

When producing power according to alt. 1 ..... 2825 tons coal

When producing power according to alt. 2 ..... 5000 tons coal

If this coal is valued as low as Kr. 30.00 per ton there will be a saving in fuel of:

According to alt. 1.....Kr. 85,000.00

According to alt. 2.....Kr. 150,000.00

Operating costs—with exception for power—would amount to approximately:

2 men per tour at Kr. 4,000.00.....	24,000.00
2/3 man's time for repairs at Kr. 4,500.00.	3,000.00
Sundry material, etc.....	13,000.00
Total Kr.	40,000.00

According to alternative 1, there remains consequently Kr. 85,000.00 less Kr. 40,000.00 or Kr. 45,000.00 to cover cost for interest on the capital invested and depreciation of the plant, and according to alt. 2, Kr. 150,000.00 less Kr. 40,000.00 or Kr. 110,000.00.

If we figure 20% for interest and depreciation, the cost for installation, according to alt. 1, could be allowed to be Kr. 225,000.00, and according to alt. 2, Kr. 550,000.00.

According to information which we have obtained, the latter sum is quite sufficient, while the former is not.

However, the price of Kr. 30.00 per ton coal used in above calculation is so low that it can be questioned if such a price can be figured on for the future.

If we figure with a price of coal of Kr. 50.00 per ton, which can be considered the average price prevailing now, the calculation will be much more advantageous for the evaporation.

According to alt. 1, the value of the coal will then be.....Kr. 131,500.00

And the corresponding profit, after deduction of the operating cost.....Kr. 40,000.00

Will be .....Kr. 91,500.00

If, in accordance with the above, we figure 20% interest and depreciation on the installation, with a coal price of Kr. 50.00 per ton, the installation will pay, even with power, as per alt. 1.

Stockholm, June 15, 1921.

Mellersta & Norra Sveriges Angpanneforening
Angtekniska Avdelningen.

The results obtained during these tests are very startling, and it is not to say too much to claim that one can now see the arrival of the day when a sulphite mill, with hydroelectric power to drive the machinery, will be able to cover its fuel requirements for cooking, drying, heating, etc., without any other fuel, except the bark from the wood-room and the fuel from the evaporated waste liquor.

The following table gives the calculated fuel consumption in kg. of an average grade coal per ton chemical pulp for an efficient mill at different times. The table is given to show the intense development of the fuel question in the chemical pulp industry during the last twenty years:

Kg. Coal Per Ton Pulp

Sulphite:	1900	1910	1915	1920	1922
Generation of power	250	(1) 200-0	...	...	...
Cooking	350	325	300	290 (2)	280
Drying	300	300	270	160	160 (3)
Sundries	100	100	80	80	60
Total	1000	725	650	530	500
Of this, bark	250	225	200	200	200
" " other self-produced fuel	...	...	...	...	250 (4)
Balance to buy	750	500	450	330	50
Sulphate:					
Generation of power	300	(1) 250-0	...	...	...
Cooking	400	350	300	290 (2)	280
Drying	300	300	270	160	160
Evaporation	150	100	(5) 350	350	350 (3)
Sundries	100	100	80	80	60
Total	1250	850	1000	880	850
Of this, self-produced fuel	...	...	(5) 600	600	600/650
Balance to buy	1250	850	400	280	250/200

1—The question of power is thought solved. (Hydroelectric.)

2—Feltless presses are introduced on the drying machines.

3—Ventilation of the dryers is modernized.

4—Evaporation of sulphite liquor is introduced. (This increases the power consumption with about 115 KW-hours per ton pulp.)

5—A new system for regeneration of the lye is introduced.

Power Plant Management

Storage and Weathering of Coal

By ROBERT JUNE, M. E.

COAL storage is a subject that is being given more and more consideration each year by power plant operators. Here are a number of reasons for this increased appreciation of the economical advantages of coal storage. Not the least of these is the danger of expensive shutdowns, due to strikes by miners or transportation workers.

There are excellent reasons why coal storage should be generally resorted to by power plant operators, by railroads and by mine operators. We, of course, are concerned with the power plant, but because coal storage by railroads and mine operators offers some indirect advantages to the power plant operators, we may mention the reasons for such storage, briefly, without discussing the means.

As far as the railroads are concerned, a million dollars invested in coal storage facilities is equivalent to three million dollars invested in locomotives and cars, if purchased for coal moving purposes only. This is true, because railroads are called upon to move coal in large quantities only through three or four months of the year and, if they have sufficient facilities to meet this peak load, there is a large portion of the year when the rolling stock will be idle. Another reason for coal storage by the railroads is that it permits the railroads to haul their own coal at times when the equipment can best be spared for this purpose, so that the equipment need not be taken from earning service to do non-productive work.

Coal storage is important to the coal operators inasmuch as proper facilities for this purpose will enable him to regulate production and to maintain a uniform output at the mines. As matters stand, the average mine is operated approximately 170 days per year. We would have fewer mines in operation, smaller overhead, and more contented labor, if all mines were equipped with coal storage so that coal could be mined when cars were not immediately available.

Inasmuch as lack of coal storage facilities by railroads and coal operators is one important factor in the present high cost of coal, it is important for every coal user to become familiar with conditions and to use such influence as he possesses to remedy them.

Reason for Coal Storage

Getting down now to the individual power plant, let us see what reasons may exist for the practice of storing coal in quantities at, or near, the plant, and whether this practice is worth the expense involved. The general reasons for coal storage by the consumer are as follows:

1—He can buy coal in quantities to better advantage at certain seasons of the year than at others, saving perhaps in this way anywhere from 50 cents to $1 per ton.

2—The practice of storing coal by power plant operators would tend to equalize prices on different grades of coal. As matters stand, over production of certain grades at certain seasons of the year, and under production of certain grades at other seasons of the year, tends to penalize power plants using certain of these grades.

3—Mine and railroad strikes, and embargoes and delays will not affect plants where large quantities of coal are stored.

4—The general practice of coal storage at the nation's power plants would help tremendously in solving the national situation by providing miners with steady work (hence at lower wages per ton of coal mined).

The question as to whether coal should be stored in the individual plant will depend entirely upon the particular conditions obtaining in the case. It is out of the question, for instance, to store coal in or near a power plant situated in the business district of a large city. Here, space is entirely too valuable for any such purposes. Unless the needs of the plant are extremely large and the source of supply somewhat uncertain, the city plant will also usually find it impracticable even to store coal in the outskirts of the city.

When we come to the small, medium, or large size power plant which is so situated that coal can be stored conveniently in close proximity to the plant, on land of medium or low rental value, the case is quite different. Here everything points to the desirability of maintaining a storage system commensurate with the plant requirements by purchasing and storing a year's supply of coal in the spring or early summer, the plant can normally effect such savings in purchase price alone as to pay for the cost of storage and handling, several times over, to say nothing of the advantages of an assured supply of coal.

As to a choice of mechanical means for effecting coal storage, this will depend entirely upon the location of the plant and the storage pile, and the amount of coal to be handled.

In previous articles, we have discussed various types of coal handling equipment, such as mono-rail,

bucket, chain and flight conveyors, etc., and it is not necessary to again describe this equipment. It should be noted, however, that in a great many cases, particularly where the quantity involved exceeds 10,000 tons, the locomotive crane with the grab bucket appears to offer the ideal economic solution.

In planning coal storage for very small plants, it may be well to remember that coal can normally be hauled cheaper by wheel-barrow than by cart, up to a distance of 250 feet.

Choice of Storage Systems

In determining a storage system to be employed, most, if not all, of the following points will have to be taken into consideration:

1—Character, size, location and value of available ground.

2—Desired total storage capacity and amount of coal which may have to be loaded or unloaded per day.

3—First cost of storage system and costs of maintenance and operation.

4—Percentage of breakage which can be allowed in handling coal.

5—Length of time coal must be kept in storage.

6—Effect, if any, of climate.

7—Adequate available water supply.

8—Means for rapid loading out of coal in case of fire.

In considering a storage plant from an economic point of view, it must be remembered that if the equipment is in operation very irregularly, costs are consequently higher per ton because of the heavy fixed charges for interest and depreciation.

We have spoken of the locomotive crane as a generally cheap and satisfactory means of handling coal for storage in the usual boiler plant. The special advantage of the crane, of course, is that its functions need not necessarily be confined to the coal pile, as it can often be employed for other purposes about the plant yard. The locomotive crane is also adapted to quite a variety of storage systems, being particularly suited to various "circular" types of storage.

Where locomotive cranes are used with large circular systems, the gauge of the track on which the crane runs is important. When possible, the gauge should be approximately as follows:

4′ 8½″	for maximum swing of	30 feet.
14′ 6″	for maximum swing of	45 feet.
16′	for maximum swing of	60 feet.
20′	for maximum swing of	100 feet.

In planning large circular storage systems, the usual arrangement is one whereby the coal is discharged from railroad cars into a pit at a central point, which pit is also the center of the circular track system on which the crane operates, the radius of the circular track being equal to the maximum swing of the crane. With such a system the locomotive crane can pick up coal from the dumping pit when standing at any point of the circular track. By a swing of the boom the coal can be deposited at any point inside or outside the circular track as far as the boom can reach. While it would be feasible to do so, it is not considered good practice to cover up crane tracks since it is very desirable to be able to operate the crane over the entire range of the storage pile in case of fire.

Characteristics of Different Coals

Some coals may be stored with greater safety than others. Danger from spontaneous combustion, however, is more apt to be present as a result of improper piling of coal than because of the kind of coal stored. In storing bituminous coal, the important consideration, as far as freedom from spontaneous combustion is concerned, is to see that fine coal and dust are not present. This would seem to preclude the storing of slack coal and run-of-mine, which are precisely the grades of coal which many boiler plants wish to store. It may be said unreservedly that it does preclude the storing of this kind of coal in the open air, as far as safety from fire is concerned. Where provision can be made to flood or to rapidly load out the coal which has caught fire, there is no special reason why run-of-mine and slack should not be stored.

Danger of Fire

Spontaneous combustion is principally due to oxidation taking place on the surface of the coal. With very fine and powdered coal there is immensely greater surface presented for oxidation than with lump coal, consequently the danger of fires is very much greater.

If lump coal alone is stored, the danger of spontaneous combustion is practically eliminated. Coal which has gone over 1½″ screen can be stored with little danger of fire. Coal, with screenings removed, has been kept in storage for many years without firing. Heating usually occurs within three months after coal has been stored. The tendency to spontaneous combustion decreases rapidly after that period. Where one has choice of coals for storage purposes, choice should be made of coal which is least friable, because less dust and slack will be produced in handling. Run-of-mine and slack coal have at times been stored without fire occurring, by the exclusion of air from the interior of the pile. Such exclusion may be accomplished by a closely sealed wall built around the pile, or by close packing of the fine coal. However, securing of satisfactory results by such methods is both difficult and uncertain. Many men with experience in coal storing, believe that wet coal, or coal stored on a damp place, is peculiarly liable to spontaneous combustion.

Water Storage

If fires are absolutely to be prevented in the storing of run-of-mine or slack coal, the only satisfactory

means is by underwater storage. Coal keeps indefinitely in good condition under water, losing none of its heating value and absorbing comparatively little moisture. Water storage possesses the further advantage in that coal does not deteriorate in physical properties, such as slacking. The cost of underwater storage is, of course, an important item, and may be as great as to preclude the use of this system. Where old quarries or abandoned clay pits are available for underwater storage, they may be at times adapted with smaller initial expense than would be required for other systems.

Method of Piling Coal

To store coal successfully, the pile must be so arranged that the heat generated will not exceed the losses by radiation. Coal freshly mined has a special tendency to oxidation and heat. This property pertains to all varieties of coal, though it varies in intensity. The liability of spontaneous combustion occurring increases with the period of time lapsing between the mining and storing of coal; hence, coal should be exposed to the air as long as possible before being placed in the pile.

To avoid spontaneous combustion, one of two principles should be observed; either the coal should be piled so that air may circulate freely through it and thus carry off the heat due to oxidation, or the coal should be so closely packed that air cannot enter the pile and cause oxidation of the fine coal. Unless care is used in piling, stratification of the different sizes of coal in the pile may occur. This is a dangerous condition, since the space between the coarse lumps of coal provide a passage through which air may enter and come in contact with the fine coal, thus giving it the opportunity to start combustion. In this connection, it is well to remark that it is not considered good practice to mix indiscriminately different kinds of coal in the storage pile, as experience has shown that this almost invariably leads to starting of fires.

It has further been noted that coal of high oxygen content seems to be especially susceptible to spontaneous combustion, a fact worth remembering when its storage is being considered.

There is no set rule as to the height of coal storage piles. Coal has been successfully stored in piles varying from 6 to 60 feet. Spontaneous combustion occurs in very low piles. Low piles are preferable since the coal is more fully exposed to the air and in case of fire can more easily be loaded out. The principal disadvantage of high piles lies in the greater difficulty of moving the coal quickly in case of fire. The idea that high piles caused heating at the bottom is erroneous, since as many fires take place at the top of the pile as at the bottom and as many near the outside as near the interior. Indeed, a depth of 5 to 6 feet seems to be a favorite point for fires to occur.

Ventilation

Ventilation by means of pipes in the coal pile has not proved a success in the United States. The expense of placing and removing the pipes is very high and unless they are very close together it is doubtful if they are of any special value other than for the purpose of thermometer shafts. In Canada, the Canadian Pacific Railroad has very successfully ventilated its coal piles, entirely preventing spontaneous combustion. The method used is that of driving pointed iron rods 1½ to 2 inches in diameter, vertically down through the pile. After the rod reaches the bottom, a bell-shaped collar is slipped over it and forced down about six inches into the coal. The rod is then tapped to pack the coal around it and to loosen the rod, and then both collar and rod are withdrawn. As soon as this is done, a rough funnel of tar paper is put on the top of the bell-shaped collar to prevent small pieces of coal falling in or being washed in by the rain. The wals of the hole maintain themselves without protection, ordinarily lasting many months. Holes are usually driven 16 inches to center. The cost, which is almost wholly labor, amounts to seven or eight cents a ton, at present prices.

Testing for Fire

Freshly stored coal should be carefully watched for evidences of heat. Fire will often be made evident by the presence of steam or gaseous odors. However, it is unwise to depend solely upon visual evidences. Thermometer pipes should be driven at intervals into the pile. It is impossible to set any critical temperature applicable to all coals in varying storage conditions. One very safe rule is to be ready to remove the coal if the temperature reaches 150 degrees F., and to load it out if the temperature rises to 175 degrees F. After coal has been loaded out, it should be thoroughly cooled before being placed in storage.

In putting out fires, water is an effective agent only if it can be applied in sufficient quantities to entirely extinguish the blaze and to cool all of the heated matter. A small quantity of water is positively dangerous.

It is the practice of the Canadian Pacific Railway always to use water if the fire is a small one and particularly if it is detected at an incipient stage. The point of high temperature is located by driving the test rods into the pile. A pit, one or two feet deep, is then dug right over the center of the trouble, and pointed rods or pipes are driven down into the heated matter. The pit is then filled with water from the hose and kept full, thus quenching the fire at its very center. If the fire is a large one, the central pit is used and in addition a water curtain made by digging a ring ditch one or two feet deep, with a row of holes in the bottom. The ditch, like the center pit, is kept full of water from the hose, and if there is any tendency for the fire to be driven downward from the

center, it is put out by the water curtain. This method of putting out a fire is not cheap but it is quick and results in much less loss of coal than other methods that have been employed.

Effect of Storage

The heat value of coal is decreased very little by storage. Firemen, however, are almost universally of the opinion that storage coal burns less freely than freshly mined coal. This tendency may be overcome by keeping a thinner bed on the grate and by regulating the draft. The loss in heating values of coal in storage may be taken as one percent for the first week, with a very moderate increase after that period, so that at the end of a year a total loss in the average case will not exceed 3 percent.

In conclusion, safety in the storage of coal depends upon a careful and thorough consideration of methods and close attention to details. Remember that you will almost inevitably have dangerous fires if you attempt to simply pile up coal without taking thought of your methods and of your means of fighting spontaneous combustion, should it occur.

Effective Safety Work

By H. M. GRASSELT

YEARS ago, the number of men and women annually killed or maimed in factories and shops was a legion. In large plants accidents were daily occurrences, and very little, if anything, was done to eliminate the causes. However, wonderful progress has been made in the protection of life and health of the wage earner during the last decade. Unsanitary factories have given way to well-lighted, modern buildings, constructed in accordance with hygienic laws. Machinery, conveyors and so forth, which were without, or at the best, with crude devices for the prevention of accidents, are now equipped with the best possible safeguards and rendered almost free from danger to the operative.

These wonderful achievements in the accident prevention movement are largely due to the intelligent and vigorous efforts of the National Safety Council.

Developments in the methods of establishing and maintaining safety standards have brought about the introduction of the Safety Committee in manufacturing plants employing a considerable number of persons.

The Safety Committee is a body of employees, elected by their fellow workers to act in the interest of their safety and security, and to perpetuate the Safety First idea within the plant. While a large plant may have departmental committees, a committee made up of one representative from each important department will suffice for a smaller establishment. Although there exist no standard numbers, a Safety Committee should consist of not fewer than three men and should meet once a month. At any rate, the committee must be large enough to insure a variety of suggestions and ideas. It is advisable to have either the superintendent or the manager as chairman.

The members should endeavor to make themselves familiar with the safety problems, and work untiringly and enthusiastically in their behalf.

A thorough inspection of the plant should precede the monthly meeting. There are in every plant so many insignificant faults and danger points which may seem quite harmless, but if not eliminated, may become the cause of a serious accident. Special attention must be paid to elevator gates, staircases and the guarding of machinery. At the meeting, which should be short and business-like, each member should be given time to express his views or make suggestions. No member should try to dominate the discussion. It is the duty of the chairman to make each meeting a success and not simply a loafing hour spent in idle gossip. He must plan his program in advance and see to it that the completed improvements have been made according to suggestions previously pointed out.

An important feature of the meeting is the discussion of all accidents which occurred during the previous month. The cases should be discussed individually, so that ways and means may be found to prevent similar accidents. It will be noticed that surprisingly many accidents are caused by carelessness; in fact, the largest percentage of them is due to neglect, thoughtlessness or indifference on the part of the employees. For instance, paper machine help delight in going barefoot about the machine room, thereby stepping rather frequently on rusty nails that protrude from the flooring or lie around. Although accidents thus sustained may appear slight, they incur in practically every case loss of time through trips to the First Aid Room or even to the physician. There are instances, where neglect of those apparently insignificant wounds led to blood-poisoning. Calender help is fond of using the fingers in cleaning calender rolls, instead of taking a little device, a sort of a brush on a long stick, by which one may clean the rolls in perfect safety. Many a mutilated hand is a remembrance of the folly of indifference.

Many other examples could be cited; it is up to the Safety Committee to educate their co-workers to carefulness and common sense. Further duties of the committee are the inspection of fire conditions,

extinguishers and exits, the instruction of new employees as to the hazards of their work and an intelligent endeavor to arouse and keep the interest of all employees in safety work. The safety movement, to be effective, must be kept continually before the employees. All rules and regulations, all the safety devices and all the safeguards that can be erected, all warning signs that can be posted, are useless unless every man is careful to see that they are maintained and every man is careful to warn others of danger.

The committee should scrutinize the weekly reports of the permanent inspector, who, by the way, should not be a member of the Safety Committee, but be taken from the ranks of millwrights or repairmen, and make his inspection independently from any made by the committee. Suggestion made by that inspector should be given earnest and careful consideration and carried out whenever approved.

Literature and photographs issued by the National Safety Council, warning signs and rules should be posted in conspicuous places, accessible to everyone.

Five-minute talks on accident prevention, safety devices and first aid also further the cause of industrial safety work.

Successful safety work is possible only where there is a real understanding of the program. A properly organized safety committee, whose members recognize the importance of the problem and hold themselves individually responsible for the safety of their co-workers, can accomplish very much. Intelligent safety work will not only decrease the number of accidents and loss of time incurred by them, but also improve the rating of an establishment and affect the premium considerably.

It pays from a humane and economical standpoint to direct all possible attention to SAFETY FIRST and to carry out all that its meaning implies. Eternal vigilance is necessary to reach the acme of safety, and constant application of carefulness is the best insurance for ourselves and our families.

How It Worked

By J. LINSEY CROSSLEY

IT WAS very confusing. There was old Bald Top in his usual place on the horizon, but, while his granite head had its old contour, and his neighbor hills their relative positions, the forested slopes I gazed upon—was it last night?—had bloomed into housetops and gable ends, with terraced openings and sloping streets. One white, winding way had, on that unbelievable yesterday, scarred its houseless, bosky solitudes.

The busy street below—could that have been but overnight the muddy, weed-edged mill road, girt with telephone poles and a three plank walk? I beheld a smooth pavement, clean as Mother's kitchen floor, bordered with turf and trees, carrying vehicles in variety unfamiliar to me and in great numbers, well made and having no useless ornaments.

Indeed when I turned to look again at the room into which I, as far as I could recollect, had been bellhopped about nine hours before, I found that every article in its whole clean competency had some definite use in comfort or service.

Breakfast served effectively and without obsequiousness, from a card that put things in plain, though to me somewhat unusual, language, added somewhat to my mystification. It appeared that those who purveyed it found me odd in manner, as I found them. Their language was English, unmistakably, but the phrasing strange, though after listening to it a short time it had the effect of great conciseness.

Breakfast over, I went out to see if I could find the old Pickerton and Finch Paper Mill.

The peculiar sense of general fitness was pervasive; clothes were very rational and no one wore a hat. Every one was comfortably dressed, and nowhere was there any sign of shabbiness. Each seemed pleasantly bent upon some definite errand. All looked cheerful, and the children, who were numerous, were well dressed, clean and had every appearance of physical welfare.

Turning to the right I found that the mill road and old creek bridge I knew were gone, and in their stead I found a street similar to that I had just left, running over a handsome bridge spanning a clear, stone-bedded stream in a ravine of fine shrubbery and flowers.

Beyond the creek had been the mill. Was that fine edifice any relation to the old mill? Yes: there was the name Pickerton and Finch, but with the words "Incorporated 1935" added. 1935? I gasped, why last night, or that which stood for last night in my bewildered mind, was in 1921, and this place was incorporated goodness knows how long ago, in 1935. How archaic I must appear to these folk, but evidently politeness was one of the qualities of the new age whatever it was, for no one stared at me.

The mill had only one entrance, as far as I could see, and when I stepped in there was no time office or "Employees' entrance." One opening did for all purposes. It was broad and several doors opened into it.

To the left were apparently the general offices and I entered the antechamber to several suites. The workers in sight were seated at what were presum-

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ably desks but to me were unfamiliar in many respects. They seemed to have adjustable tops to which the books and papers were attached, and each as finished with could be put out of the way though always available.

One of the staff came and inquired what could be done for me.

I asked if I might go out into the mill as a visitor and was informed that they welcomed visitors and would have some one go with me.

A pleasant young man was called, by his Christian name, and after introducing himself asked my name. He astonished me by remarking "There was a man of that name in the old mill about 1920." He asked if I knew him. I said he was related to my father, and waited for the mystery to clear up. Was this a reincarnation in some "fiddler's green"? If so I had missed the purgatorial experience that is said to be required of papermakers.

Some Strange Sights

We entered a wareroom in which large cylinders of white material were stacked. On close inspection it proved to be pulp of some wood fibre. It was dry, had no wrappers and no bands, but had not suffered to any extent by handling.

"This is our raw material," he said.

"What is it?" said I. "I used to be familiar with paper mills—as a boy—but I do not recall seeing material like that."

"It is spruce fibre, which used to be called pulp, but that term was dropped ten years ago when the large number of different fibres in use made is necessary to adopt more definite terminology."

"But how is that package made up?" I said.

"That is really quite recent," was the reply. "One of our shipping room men, who left us to take up work in a wood fibre plant, devised it to facilitate shipping. The fibre with the large amount of water naturally associated with it, is sprayed into a vacuum as in the well known drying processes. The apparatus is adjusted to leave a small amount of water in the fibre, which is then packed into these cylinders, round a central pipe, which is provided with lateral slits. It is subjected to great pressure from the top and bottom, while the exhaustion is carried to a high degree through the central pipe, removing the residual moisture. You will note the hole at the center of the top. The cylinder is found to hold its shape very well, as you see. It is essential that the fibre be very clean, both from resinous and mineral matters, in order first to remove the moisture, and, second, to avoid trouble in disintegration. We can use this form of package with all the long fibred materials."

We passed on to what I guessed was the beater room or its equivalent, though it bore little resemblance to that my memory told me I had been in a few days before.

"This," said my guide, "is the beating room. You will probably have in mind the beaters you saw as a boy. They are here of course, in principle, though we have been able to develop the continuous form by means of a device originated by one of our older associates, in conjunction with the multiple roll beater. The beaters you will recall had a roll with a bed-plate underneath. The stock passed between these and up over the backfall. The first change was that introduced by extending the bed-plate to the quadrant of a circle, then an extra roll and later several were added. This does away with the refining engine which was such a power consumer. The fibrous material is mixed in the first chamber, then flows into the multiple roll section. Passing this, it goes to an equalizing chamber, and from there goes to the machine room."

Passing on to the machine room I again noted a change.

The machine had a wire, but it rose vertically out of the flow box, which therefore could hardly be called a flow box in the proper sense of the term.

"How long has this been in operation?" I asked. "In the mill I knew the wire ran horizontally or with a slight slope."

"It was only installed two or three years ago in this mill. It was devised and installed in another mill about five years ago. The arrangement is made possible by special mixing effects in the supply chest. a submerged suction roll and a very fine meshed wire. It is the result of investigation by a machine tender who worked it out during a research leave."

"What do you mean by a research leave?" I asked, almost before he got the words out.

"Every man employed in paper mills has the right to ask for a six months' post graduate course after spending two years in the mill. We call it a research leave because nearly all the men use that time to investigate some point in the department of the mill that they have worked in."

"But you don't mean to tell me that all the employees are graduates?"

"Well, you must have been out of touch with the industry a long while," he said. "Every man in our mills must graduate from some institution of university standing, though there are still a few of our older men who did not do so, having been in as juniors when the associates agreed upon the requirement. Another thing, we are not employees. That term was dropped in the agreement of incorporation. We are associates. The mill belongs to us. When a man graduates in papermaking, there is always a place open to him in some mill.

"When he is placed and has worked a year, he is given one voting unit of the treasury shares. No shares are owned outside the mill. When a man leaves he turns in his shares. They are of no value to him, as he has ceased to be associated, but as long as he is with us he has the dividends, which in this

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way serve as increased salary. The longer a man has been associated the more shares he has. Seniority is, in fact, the only difference there is between us. There is an annual election of officers, though each office is held two years. About half the executives retire each year and cannot be elected again until at least two years elapse. This keeps our policy progressive but not jerky. Another rule is that the executive officers are always nominated from different positions in the mill, all requiring equal educational qualifications. In this way no department is overlooked in administrative attention."

"That is extremely interesting, but how is it that the paper industry is so far in advance of the others in these respects." I hazarded this and then recalled the general air of public competence in the city.

"The others are coming in," he said. "You have, no doubt, noted the excellent state of affairs in the city here. The civic administration is based on the principles we evolved."

Still wondering, I asked if any particular idea had led directly to the greatly improved condition.

"Yes, that was the case," he answered. "The movement dates from about 1922 when, as the result of coöperation throughout the industry in North America, a series of special text books was prepared and definite educational policies inaugurated.

"In a few years most of the men engaged took up study of the work they were doing with two very definite effects. The men took an interest in the scientific principles underlying their work for one thing, but the most important result was that they decided to secure better education for their children, something more than mere schooling.

"The increasing proportion of educated men and women in paper mills led to a rapid development of more democratic administration.

"Our mill was the first to recognize the changed status and reorganize. It had many new features and these have been successfully introduced in other mills. We are all equals and every man has the same salary. Seniority alone brings larger salary through the share system.

"Shares are also allotted to associates who devise improvements. Many important changes were introduced after the men actually engaged in the mills had a chance to get the correct view of the principles they were applying in their work. Things that were more or less traditional were dropped and work was governed on a basis of physics and chemistry.

"The old papermaker was always alert and intelligent. When he had the extra equipment of science to appreciate the laws governing the operations he was engaged in, he quickly applied it with very profitable results."

We walked a little further into the room. I do not recall just what the new designation was for the department.

The portion I knew as "presses" was housed in. Replying to my inquiring look—"Second extraction section," he said, "recently covered in to maintain equal temperature conditions, which are found to give best results at a little above body temperature, thirty-nine degrees standard. You will note how thoroughly the remainder of the apparatus is closed in. For some years now we have supplied refrigerated air to the third extraction section, where the final drying takes place. Refrigeration of air to withdraw water was successfully introduced by Gayley in blast furnace practice over fifty years ago. For drying, we use air of less than five percent humidity."

Noting an odd repercussive sound, I turned to ask him about it, but his voice, himself and the paper mill faded away and I found myself still in bed. Some one was knocking vigorously at the door and I heard the voices of Carruthers and Williamson loudly asking if by any chance I recalled that the Joint Executive on Text-books had traveled all the way to Finchville to hold a meeting that day.

More Pulp Per Cord of Wood—Why Not?

By JOHN D. RUE

In Charge, Pulp and Paper Section, Forest Products Laboratory, Madison, Wis.

THE pulp and paper industry stands seventh in the list of great American industries. In 1920 over 7,000,000 tons of paper was produced in the United States, in the manufacture of which 6,114,072 cords of wood were consumed. This wood cost the manufacturers over $116,000,000. One of the prominent examples of waste and inefficiency in this country is found in the present methods of handling and utilizing our forests. The pulp and paper industry is a large contributing factor in the production of this waste, since 8 per cent of the annual cut of timber goes into the manufacture of paper. Each cord of wood cut contains a certain quantity of potential paper-making material. When manufactured into ground wood pulp, all but the water-soluble portion, or approximately 96 per cent of the wood, exclusive of the bark and knots, could become paper. When manufactured into chemical pulps, probably between 55 and 60 per cent of the wood could become paper. Anything less than these amounts really constitute a waste. Let us consider the causes for such wastes and how far they might be avoided.

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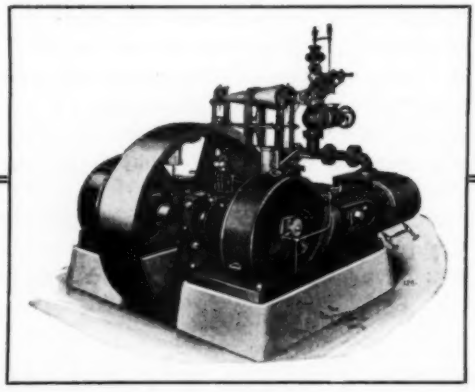

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Bulletin E-4 gives a detailed description of this engine.

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It is comparatively easy to point out the location of the losses, but, unfortunately, the methods of measuring the wood used and the pulp produced, especially the former, are so inadequate that no real knowledge of percentage yields can be obtained. Such information is most essential, however; for an accurate knowledge of existing conditions is prerequisite to improving these conditions.

Waste Caused by Decay During Storage

If we start our consideration with the pulpwood after it has been cut, we will find our first source of loss in decay during storage. A certain amount of decay in the wood as received must be expected, for the pulp industry cannot compete with the lumber industry for the finer grades of wood. Lack of proper care in handling and storing is responsible, nevertheless, for large decay losses. The wood loses in weight, causing a proportionate loss in the possible yield of ground wood pulp as well as a loss in the quality of the product. Furthermore, the destructive organisms have a selective action on the cellulose, so that the potential yield of chemical pulp is reduced. Losses from the decay of pulpwood and wood pulp are estimated at at least $5,000,000 per year, and could to a large extent be prevented, provided more were known about proper methods of handling and storing the various species, and more of that which is known were put into practice. Investigations of preservative treatments for ground wood pulp have already indicated most encouraging results in the prevention of decay during storage.

In the grinding of wood, losses are met with on account of the production of excessive amounts of fine wood flour and of large slivers. More efficient control, as well as improvements in the quality of the stone and in its care during operation could do much to lessen these losses, which amount to over 5 per cent, or 75,000 tons per year, valued at $3,000,000.

The fundamental object in using chemical processes in the manufacture of pulp is to produce a pulp of greater durability and of higher quality than is possessed by ground wood pulp. Approximately 55 to 60 per cent of the weight of the pulp consists of cellulose, and it is reasonable to expect that it should be possible to obtain this amount of a white pulp product. Higher yields should be obtained when a less pure product will suffice. As a matter of fact, in practice less than 45 per cent of the wood is obtained as high-grade pulp, or less than 75 per cent of the potential yield. In other words, the wood consumed during 1919 should have produced 600,000 tons more than the 2,000,000 tons actually obtained, which on a very conservative estimate would represent a value of $30,000,000. It would not be fair to the pulp manufacturers to estimate that this loss is entirely or even largely due to inefficient methods of operation, although it is true that through a more thorough system of technical control much saving could be realized both through improved yield and through improved quality of product. It is fair, however, to charge the industry with a large portion of this loss, because it has failed to prosecute vigorously the scientific investigations necessary to unfold the underlying principles of the processes. Such knowledge is fundamental to the rapid improvement of pulp manufacturing processes and to the design of efficient plants and equipment.

It is a regrettable commentary on the industry that the past fifty years has seen so few changes in the pulping processes. With the exception of an increase in the size of units and in the rapidity of production, pulp manufacture today stands practically where it stood during the last quarter of the nineteenth century. There are evidences, however, of an awakening to the need for intensive investigations along these lines which give promise of greater progress in the future.

More Favorably Located Species Must Be Used If Possible

Any discussion of the inefficient utilization of wood in pulp and paper manufacture would not be complete without emphasizing at least one other factor, a factor which when fully appreciated is most startling. Fifty-six per cent of all the pulp wood consumed is spruce. If we include with spruce hemlock and balsam fir, these three species constitute 77 per cent of the entire pulpwood consumption. The significance of these facts becomes evident when we realize that the supply of these species comes almost exclusively from the northeastern section of the United States, and that it is estimated that this supply constitutes only 3 per cent of the entire wood supply of the country. The drain on this limited number of species is causing their rapid depletion. Pulp mills which were a few years ago in the heart of their pulpwood supply are now forced to haul their wood long distances and in many cases past large stands of available timber, which, however, are considered undesirable for pulping. This state of affairs means lower profits to the manufacturer and higher prices to the consumer. Here again intensive investigation and research are needed to point the way to economic means of utilizing more favorably located species. In a field of such wide application and universal interest the highest degree of co-operation in such investigations is desirable, if not imperative.

Northern Pines the Most Promising Possibility

Species that are to meet satisfactorily the demands for pulpwood must be favorably located with respect either to present mills or to the pulp markets. An increased supply of spruce, hemlock and fir can be found only in the far West; too far from present mills and too far from present pulp markets to warrant the extensive building of new mills.

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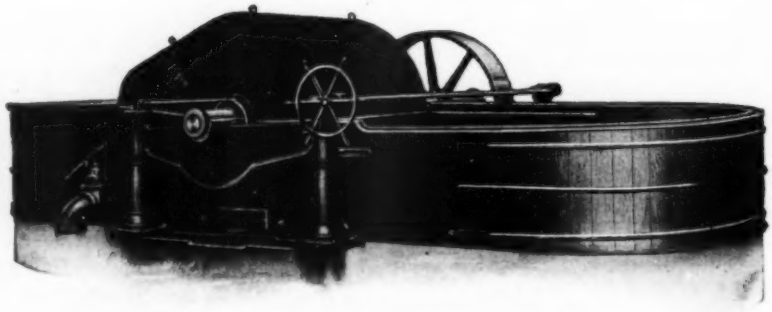

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A goodly supply of hardwoods is available especially in the Central and Southern States, but the shortness of their fiber greatly limits their field of usefulness. The pines, however, still remain as an important possibility. If the Northern pines could be satisfactorily used, the supply of pulpwood to the mills now using spruce, hemlock and fir would be immediately doubled. Five times as much more pine is available in the Central, East Central and Southern States. These localities would be within range of pulp markets and the supply of pulpwood could be obtained without undue competition with the lumber industry. Here again the one outstanding need is for intensive research to blaze the trail to successful utilization.

Sins of omission are quite as grave as those of commission. The fact that the industry has failed to provide for an early solution of these problems does not relieve it one whit from the responsibility for the inefficiencies and waste which this failure involves. It is a matter for great encouragement that the leading organizations of the industry are turning their attention to these problems. The need is urgent, and procrastination spells catastrophe.

Rope-Drive Precautions

THE subject of rope drive is given attention in a recent issue of the Travelers Standard, the Travelers Insurance Co.'s monthly magazine, and several good suggestions are made for securing safe and economical operation.

A pure manila rope is advised as being best for power transmission. In order to keep its deterioration down to a reasonable limit, the sheaves over which it is run should have a pulley diameter equal to at least forty times that of the rope, when the speed is around 4,500 ft. per min. At 3,000 ft. per min. the sheave diameter may be only about twenty-seven times that of the rope, as deterioration is not so pronounced at lower speeds.

An important question is the angle of the groove in the main pulleys. A very steep groove grips the rope securely, but on the other hand it causes too great an amount of wear and uses additional power because the rope tends to stick. A very shallow groove is likely to result in slippage and excessive wear. A 45-deg. angle V-groove is recommended, and it is said that experiments have shown that an angle smaller than 40 deg. should not as a rule be used. Half-round grooves in cast-iron pulleys have proved unsuccessful on account of slippage. With wooden pulleys, however, it is better practice to use the half-round grooves than the V-groove, because the coefficient of friction between the rope and the wooden pulley is about 40 per cent greater than for an iron pulley. Therefore, the rope will be gripped securely enough by the round groove and will not wear out rapidly.

The different grooves on the main pulley should be as nearly as possible uniform in shape, smoothness and especially in diameter. If there is any difference in the diameter of the groove, the situation is the same as though two belts running at the same speed were to drive different-sized pulleys on the same shaft; it is evident that slippage would inevitably occur. This would be most noticeable in the English (or separate-rope) system, but would still be objectionable in the American (or continuous-rope) drive.

Great care should be taken to keep the rope from breaking, not only from danger of loss of life, but also of the probability that a broken rope will become tangled with the others and cause a shut-down. Various warning devices have been installed, many of them consisting of a wire so placed that a piece of broken rope flying loose around the pulley will strike it and close an electric circuit, so that a bell will ring. The ropes should be inspected frequently for signs of failure.

When power is to be transmitted over more than 100 ft., wire rope is commonly used, and by setting up successive pulleys 350 to 400 ft. apart, it is practicable to carry the drive several thousand feet.

Wire rope is from three to six times as strong as manila rope, according to the manufacturers, but it must be remembered that this does not apply to short drives, where wire is generally found unsatisfactory.

As wire rope is much less flexible than manila rope, the size of the sheaves and pulleys must be considerably greater. If a so-called 6 x 7 wire rope (composed of six strands, each having seven wires) is to be used, the sheave diameter should be at least 100 times that of the rope. Better results will be obtained if the sheave diameter is from 125 to 140 times the rope diameter.

Wire rope should not be run over a bare iron sheave; the bottoms of the grooves should be recessed and filled with wood blocks, leather, or rubber. It is said that the best results are obtained by the use of rubber sections separated from each other by pieces of leather. The filling should not be flat, but should have a slight circular depression in which the rope can rest.

The sheaves should be perfectly aligned and the shafts should be parallel, as otherwise rubbing, side-swaying and jerking will be likely to result.

A new wire rope will be likely to stretch somewhat during the first few months of service, making it necessary to take up the slack. Tightener-sheaves should seldom be used; the rope should be shortened and the ends respliced, and this should be done by a thoroughly experienced workman.

In cases of either wire or manila rope drive, wherever there is possibility of anyone walking into the ropes, suitable guards should be set up. If the lower rope is over 8 ft. from the ground, no guards need be used, except for one under the rope to prevent its falling upon anyone walking underneath.

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PAPER

Annual Review of 1921 Activities of the American Paper and Pulp Association

TO LIST the accomplishments of the American Paper and Pulp Association during the year just closed would be to write a journal of the work of the association, day by day. Constant development has been the watchword of the entire organization.

Friendly and advantageous co-operation with governmental agencies at Washington may be ranked high among the many forward steps taken by the association during 1921. This co-operation has been with different departments and bureaus, as well as with individual officials, and as time goes on will prove to have been of great importance to the industry.

Not the least important event of the year was the part played by the association in the steps taken to stop the dumping of foreign paper in this country in an effort by European manufacturers to undermine the paper industry of America.

The selection of a commodity man for the paper industry in the Department of Commerce, on the same terms as such men have been named by Secretary Hoover for the lumber, steel and a dozen other basic industries, is daily anticipated, after a long campaign by the American Paper and Pulp Association to secure this recognition of the paper industry and its needs. The placing of a paper specialist in the Bureau of Foreign and Domestic Commerce will mean great things to the industry.

It is probable that a strong advisory committee from the paper industry will be named to co-operate with the paper commodity man when such a man is named. In this case, as in other contacts with governmental authorities, the work of the industry does not stop with the first step. The industry must be on the alert to make effective the carrying on of work started through its agency. For instance, it will be of little value to secure favorable tariff legislation, unless aid is given the customs authorities in preventing the evading of such duties as may be fixed by Congress.

The forestry legislation, to which a Congressional committee has devoted almost all of the week ending January 15, is part of the work of the association started in 1919, and continued with growing success until there is every reason to believe that the next year will see the enactment into law of the basic principles of the legislation for governmental co-operation with state and private agencies for the protection of the American forests for which this association has labored.

And as the year closes, two important steps have been taken by the association, in the interest of the entire industry.

Dr. Hugh P. Baker, executive secretary of the association, has written Attorney General Dougherty, offering aid of this industry in eliminating the profiteering retailer. Instances in which the paper manufacturer has been blamed for high prices which in fact were due to the taking of profits in some cases of several hundred percent by retailers have been mentioned, and this letter is in effect a protest against the blaming of the paper manufacturer for the high prices of printing, when such prices are, in fact, due to the excessive wages paid by printers to their men. In this connection, it is interesting to note that this condition in the printing industry has caused the cancellation of important catalog jobs, such as the annual catalog of a big Chicago mail order house.

This printing cost element is strikingly shown by the following table showing comparative wages in 1913 and 1921:

	1913 48 hours	1921 44 hours	% Increase 1921 44 hours over 1913 48 hours	1921 48 hours	% Increase 1921 44 hours over 1913 48 hours
Errand boys	$ 5.00	$15.00	200.0%	$16.36	227.2%
Job feeders	12.00	28.00	133.3%	30.55	154.6%
Cylinder feeders	17.50	37.50	114.1%	40.91	133.8%
Cutters	18.00	42.00	133.1%	45.82	154.6%
Cylinder pressman	24.00	46.00	91.6%	50.18	109.1%
Job pressman	25.00	40.50	62.0%	44.18	76.7%
Hand compositors	24.00	50.00	108.2%	54.54	127.25%
Linotype operators	27.00	50.00	85.0%	54.54	102.0%

The other important development of the closing days of the year was the appearance of the American Paper and Pulp Association, as the spokesman for the entire American paper industry, excepting newsprint, before the Senate Finance Committee in urging adequate tariff protection for the industry. Previously, before the House Committee on Ways and Means the Association had presented through its Tariff Committee a joint brief, outlining the tariff situation of the entire industry. After changes had been made in the Fordney Tariff Bill, and the bill had gone to the Senate, a supplementary brief to meet the changes made in the original bill was filed in the upper House. While the interests of different groups of the industry were in some cases conflicting, the appearance of the association as a whole, through its Tariff Committee, made a strong impression on Congress.

In the field of government co-operation much has been done, chiefly preliminary work, such as the collaboration with governmental agencies in the study of standardization. A special committee has been serving in an advisory capacity to the Bureau of Standards. Particular co-operation has been effected between the industry and the Forest Service. This has resulted in the publication of the bulletin on Pulp Wood Consumption, and a preliminary study of the prevention of pulp wood decay. The complete report on the subject of decay has been prepared by the specialists of the Forest Products Laboratory, and its publication will be undertaken as soon as the expense can be underwritten.

As a result of the association's co-operation with the National Lumber Manufacturers' Association, a ruling was issued by the internal revenue bureau postponing the time for filing of amended returns, at a time when the paper manufacturers, unable to file such amended returns at the time originally fixed, would have been forced to pay heavy penalties for non-compliance. Later the association has again, through co-operation with the Cost Association, secured and distributed first hand information relative to the new revenue bill.

An appearance before a Congressional committee which was considering legislation against stream pollution, which would have closed entirely many if not a majority of the country's paper and pulp mills, aided in convincing the committee that more should be known about this problem before such blanket legislation was enacted.

And many other matters of less moment have been handled successfully for the paper industry through the association's appearance before governmental bodies or representatives. Of this character has been the co-operation between the association and the officials charged with the duty of investigating the application of the principle of American Valuation.

During the year the American Paper and Pulp Association has been constantly more active in effecting co-operation between the paper industry and other national industries, sometimes by direct co-operation, and at other times by joint efforts through the Chamber of Commerce of the United States. The secretary of the association was made vice-chairman of the National Chamber's Forestry Committee, which traveled 10,000 miles to present a full report on the needs of the nation in maintaining its forests, and has also been made a member of the chamber's Committee on Reclamation of Waste Land as well as of the International Chamber's committee to discuss plans for the convention in Rome next September. The association has also participated in various conferences called by the National Association of Manufacturers. President Defrees of the Chamber of Commerce of the United States was the chief speaker at the Fall Business Conference, indicating the chamber's spirit of co-operation with this industry.

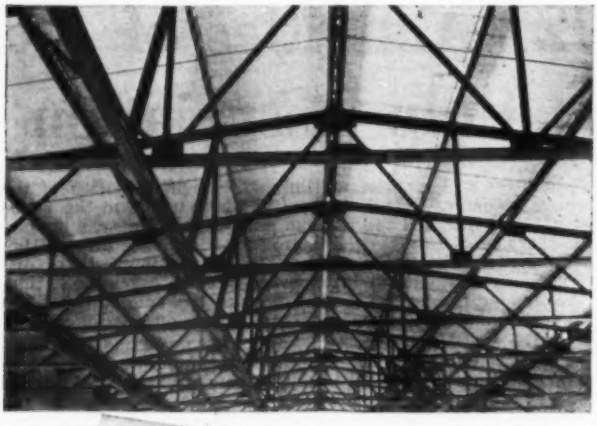
The participation of the paper industry through this association in the work of the Industrial Conference Board is another example of the manner in whcih the industry is participating in the attempt to solve great national problems.

The manner in which the paper industry has advanced in co-operative work with other national groups is thus more and more in evidence. Other associations are more and more frequently calling on the American Paper and Pulp Association for co-operation, and in many cases assistance in solving their own problems.

There can be no doubt that American business would be in a better situation if industries co-operated with each other, as individuals are learning to co-operate effectively through trade associations of their own industries.

Important internal developments in association activities have been recorded. The Woodlands Section has just passed its first birthday.

The Information Service, established April 1, is still less



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than a year old, but has through its activities justified its establishment, according to letters received from many of the leading men in the industry. The Information Service has developed a considerable body of material for the entire industry, and has been publishing statistics from time to time which have been collected from various sources. The publication of The Paper and Pulp Industry has been assigned, with much of the other preparation of printed material, to this department. Proper preparation and distribution of material of news interest which has developed from time to time has been another of the duties of this department. There has been developing an increased call for published material of the association, as evidenced by the growing number of public libraries which ask for the publications of the association. Additional editions were required of the Pulp Wood Consumption Bulletin, of the preliminary study on pulp wood decay, and the call for copies of the proceedings of the spring convention and fall business conference was large.

The Information Service has also taken up the distribution of motion pictures of the industry, routing existing pictures, and helping to take the industry to the public by motion and still pictures. A dozen state universities have asked for paper-making film to go on circuit in their respective states, far more calls developing than existing material can fill.

Lecture service before business, civic and school organizations is being provided by this department also, and a special field of work has been found to be the public schools in their studies of industrial development.

A gratifying feature of the year's developments has been the growing spirit of co-operation between the affiliated associations through the central organization, which has made possible much of the record of accomplishment of the federated organization.

While the development of text books for the vocational education of paper mill employees has been a specific accomplishment of the technical associations, the part played by the American and Canadian associations of manufacturers in this work cannot be overlooked, for the mills have financed the work done by the technical men. In this, as well as in the cases of the Cost and Salesmen's and Superintendents' associations, the American Paper and Pulp Association has been an important factor in work done through those associations.

A work of the association that has been most effective has been the aiding of some of the smaller associations to become independent, and to give them a chance to prove that there is a field in these groups for organization. The Glassine and Greaseproof Manufacturers' Association is now functioning independently, and the Gummed Paper Manufacturers' Association plans expansion of its work. Several other of these smaller groups have been assisted in this manner by the central organization.

The Fall Business Conference at Chicago can now be considered as an annual event of the association as a result of the success of the 1921 meeting, when in the midst of business depression there was a large attendance and widespread interest in the discussions which were held.

The card indexing of 10,000 watermarks and brands is by no means a minor accomplishment of the year, for as time goes on this record of distinguishing marks will increase in value.

In conclusion, it should be noted that this is not intended to serve as a review of the year's work in detail. Such a report is made each year by the secretary at the annual meeting in April. At the beginning of a new calendar year, however, it is well to look back at the year's accomplishments, as well as to look forward at the prospects of the coming year.

Protest Against Transfer of Forest Service to Department of Interior

ON the eve of the opening of a solid week of congressional committee hearings on the nation's forestry problem, the American Paper and Pulp Association has adopted by vote of its executive committee resolutions against the proposed transfer of the United States Forest Service to the Interior Department from the Department of Agriculture.

Since 1919 the association has been advocating a comprehensive national forest policy to assure a continuous supply of raw material for the industries dependent upon the forest, and is, like the American Newspaper Publishers' Association and the American Forestry Association, one of the members of the National Forestry Program Committee, which has sponsored the Snell-McCormick bills which will be given hearings probably to last a week beginning Monday, January 9, before the House Committee on Agriculture. The future of the paper industry is dependent upon a permanent supply of wood from our forests, and paper companies have led other industries of the country in actual reforestation of cut-over forest land.

On December 27, 1921, R. S. Kellogg, chairman of the National Forestry Program Committee, sent a strong letter of protest to President Harding against the proposed transfer, as follows:

R. S. Kellogg's Letter

The President,
The White House,
Washington, D. C.

Dear Mr. President:

The foresters and friends of forestry throughout the United States view with deep concern Senate Bills 2203, 2382 and 2740 and other measures reported to be in preparation, but not yet introduced, the purpose of which is to transfer the National Forests or the Forest Service from the Department of Agriculture to the Department of the Interior. The basic functions of the Forest Service are to protect, utilize and increase the timber growth on 150,000,000 acres of national forests, and to coöperate with the States and timberland owners to bring about continuous timber production on 300,000,000 acres of other forest land distributed throughout the United States.

The entire problem has to do permanently with the nearly one-fourth of the land area of the country suitable only for timber growth, just as the other three-fourths adapted to farm crops is the problem of the other bureaus in the Department of Agriculture.

Forestry and agriculture are by nature related; farm crops and tree crops spring alike from the land, and the difference in the number of years required for their maturity does not lessen this relationship nor the interlocking of the work of the Forest Service with the other activities of the Department of Agriculture.

The Forest Service coöperates with the Bureau of Plant Industry and the Bureau of Animal Industry in problems of stock grazing on the national forests; with the Bureau of Public Roads in road and trail building, which are essential to fire prevention and general administration of the national forests; with the States Relations Service in the development of 200,000,000 acres of farm wood lots; with the Weather Bureau in studies of the relations of forests to stream flow and of climate to forests and their protection; with the Bureau of Plant Industry in the work of forest experiment staticns and studies of fungous diseases which destroy both forests and forest products; with the Bureau of Entomology and the Biological Survey in combatting insect and animal attacks on timber; with the Bureau of Soils in studies of soils as affecting forest growth and in the classification of land for agricultural homestead settlement in the national forests, and with the Bureau of Crop Estimates in the collection and distribution of information for wood lot owners and the users of the national forests.

The big job of the Forest Service is to promote the continuous production and best use of the forest supplies which the country cannot do without. It is a job which calls for a high order of administrative talent, coupled with a great variety of scientifically trained expert assistance of the character that has been responsible for the splendid record of achievement of the Department of Agriculture since its inception.

To transfer the Forest Service from the Department of Agriculture to the Department of the Interior, or to claim that its work is more nearly related to the latter, indicates a mis-

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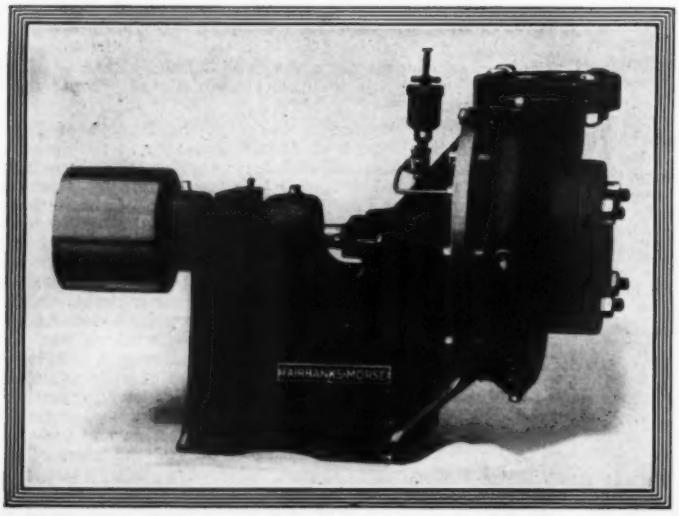

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understanding both as to existing facts and to the scope and functions of the Forest Service.

The Forest Service and its predecessors, the Bureau of Forestry and the Division of Forestry, have always been in the Department of Agriculture, where they rightly belong. The administration of the national forests was transferred from the Department of the Interior to the Department of Agriculture on February 1, 1905, because that seemed to be the only way to get them properly used and cared for.

Their history for the past sixteen years has fully justified the action of Congress in putting the national forests in the Department which handles problems of a related character.

To transfer the Forest Service to the Interior Department would not be progress in any way in the protection and utilization of a great natural resource, nor would it promote economy and efficiency in the handling of government business, because the small gain claimed on the basis of better coördination of public land administration would be greatly outweighed by the loss of intimate contact with all the other bureaus of the Department of Agriculture.

The history and traditions of the Interior Department have been entirely in the direction of the disposal of the public domain; those of the Department of Agriculture in the direction of the protection, development and utilization of the soil resources of the United States.

Can there be any doubt to which class of activities the work of the Forest Service is most closely related?

Very sincerely yours,
R. S. KELLOGG,
Chairman.

Resolutions

The resolutions adopted by the executive committee of the American Paper and Pulp Assocation are as follows:

"In 1919 and at nearly every one of its meetings since, the American Paper and Pulp Association, representing the paper industry of the United States, through its Committee on Forest Conservation, has taken definite stand in favor of an effective and aggressive forest policy by the United States and by the several states—and has repeatedly voted in favor of a policy based upon co-operation between the Federal Government and the several states.

"This aggressive interest of the paper industry in forestry is based not alone upon the action of the association, but upon the fact that the future of the paper industry is dependent upon a permanent supply of wood from our forests. An increasing number of paper manufacturers are owners of stumpage in our forests, and therefore vitally concerned with making the forests of the country continuously productive.

"In view of conditions outlined above, the executive committee of the American Paper and Pulp Association, by letter vote, taken during the week of December 19, 1921, passed the following resolution:

"Whereas, The proper handling of the forests and the forest lands of the United States is a land problem and therefore a problem of tremendous economic significance for the future of this country.

"Whereas, The problem of growing forests is linked closely with the problem of using agricultural lands properly, meaning that the question of deciding as to proper use of lands will be in the future a question upon which the forester and the agriculturist must work very closely, and

"Whereas, Many of the scientific problems confronting the Forest Service in the handling of forest lands and in developing better use of the forests are problems which necessarily involve other bureaus of the United States Department of Agriculture; therefore

"Be It Resolved, By the American Paper and Pulp Association, that the association, representing the paper industry in the United States, is opposed to the transfer of the United States Forest Service from the Department of Agriculture to the Department of Interior.

"It believes such transfer will make for neither efficiency nor economy, but will rather so disturb the present development of forestry and the working out of forestry problems that the industries dependent upon the forests will suffer from such disturbance.

"Be It Resolved Further, That we urge serious consideration by those in Washington concerned with the reorganization of government of the interests of the industries of the country in our forests, and the disturbance which is bound to arise in these times of difficult business conditions from upsetting and disturbing the work of a bureau—the Forest Service—which, through efficient and consistent work, has gained friends, not only among those interested in the use of the forests, but throughout the United States."

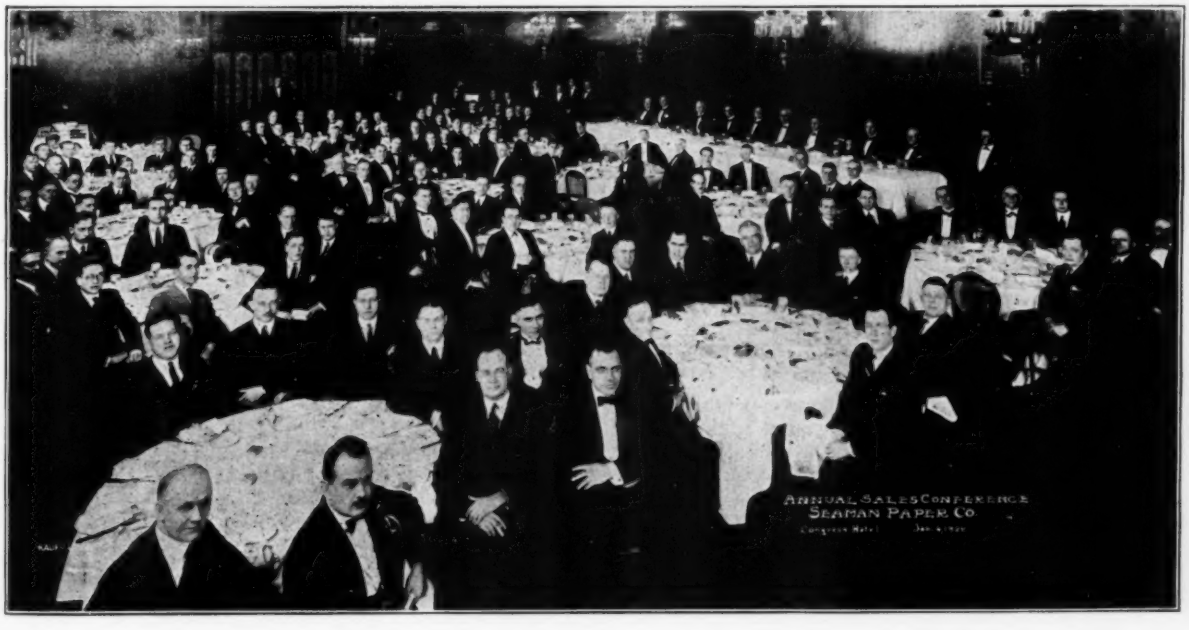
Seaman Paper Company Sales Conference

If anyone who is interested in paper manufacturing or selling should have visited the Congress Hotel on Wednesday, January 4, he would no doubt have thought that one of the big annual meetings in this industry was being held, as the corridors were filled with men interested in either paper making or paper selling. It was the Annual Sales Conference of Seaman, U. S. A., otherwise known as the Seaman Paper Company, of Chicago.

Representatives of the Seaman Paper Company's different branches from Cincinnati, Louisville, Milwaukee, Minneapolis, St. Paul, Des Moines, Boston, New York, Philadelphia, Buffalo, Cleveland, St. Louis, Kansas City, New Orleans, Ft. Worth and Detroit were in attendance at the business meetings, which were held in the Florentine room of the Congress Hotel at 10 a. m. and 1:30 p. m.

During the morning meeting there were various addresses and talks given by the officers and men representing the different sections in the country.

At 12:30 a luncheon was served in the Florentine room,



Greetings

THE SPIRIT OF THE SEASON PROMPTS US TO EXPRESS TO OUR MANY PATRONS AND FRIENDS OUR APPRECIATION OF YOUR PAST FAVORS AND WE EXTEND OUR BEST WISHES FOR A HAPPY AND PROSPEROUS NEW YEAR.

The Smith & Winchester Manufacturing Co.

South Windham, Conn.

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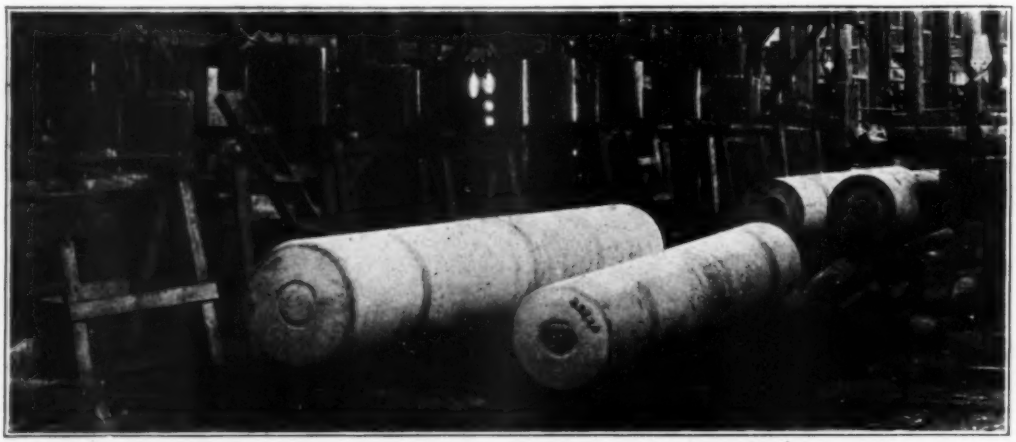
Is Revolutionizing the Whole Paper Making Industry



If your Paper Machines are not equipped with Press Rolls of BARRE GRANITE you are not getting the results that you should get, for it is a recognized fact that granite rolls are much superior to any others and Barre Granite the best of all. Let us tell you about them.

Jones Brothers Company

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after which the afternoon meeting was held, which was composed mainly of talks and addresses by men connected with different paper mills whose product is sold either wholly or partially through the Seaman organization.

In room 1120 of the Congress Hotel various printed exhibits were shown, the paper of which was furnished through this organization.

At 6:30 p. m. a dinner was served in the Florentine room to about 160 men representing the company in Chicago or in other cities, a large number of paper manufacturers and some of the good friends of the organization. During the serving of the dinner a splendid entertainment was given, the best part of which was noted down on the program as "The famous Seaman quartette, world's premier artists," which was composed of Ted Woodruff, Jack McCarthy, Bill Gallier and Gus Wuerst. Part of the regular entertainment was a very fine quartette, but they could not sing with the Seaman quartette; at least, the diners enjoyed the latter the most.

After a splendid repast Mr. George M. Seaman, president of the company, introduced Judge Charles F. Moore as toastmaster, who delivered one of his well known entertaining and instructive talks, after which he introduced in order Mr. Henry Schott of the Seaman Paper Company, Mr. V. D. Simons, Mr. Charles Folds and Mr. Arthur Nevius.

This getting together in conference of men connected with large organizations is no doubt extremely helpful and profitable to both the organization and the men connected with it. The good accomplished much more than repays all expense and trouble incurred, and we believe that such a meeting as the one held by the Seaman Paper Company will be of inestimable good to all concerned.

May the new year be extremely profitable to the Seaman Paper Company and all those who attended. This wish was naturally expressed many times at the conference, and we believe this getting together will help to make it so.

Educational Work in the Paper Industry

THERE are few if any industries on this continent entitled to greater praise for their educational efforts than is due to the pulp and paper industry. Several years ago it became evident that the demand for night schools and other educational opportunities in pulp and paper centers could not be satisfactorily met without authentic textbooks and material upon which to base instruction. The organizations of the technical men in the industry in Canada and the United States appointed a joint executive committee which immediately drew up plans for the preparation of a suitable text and estimated what appeared to be an adequate amount for defraying of the cost of preparing the manuscript. Experts in each of the principal phases of the industry were engaged to write the sections dealing with their particular departments and the necessary editorial staff was employed to put the manuscripts into uniform style, properly prepared for the printer and in language rewritten where necessary in order to present the information in the clearest possible manner, which is a vital factor in the success of a textbook, particularly one intended for correspondence instruction.

The whole scheme was something without precedent and on this account, and because the number of necessary illustrations and the work required to prepare them properly was somewhat under-estimated, the original fund of $30,000 which was quite promptly forthcoming from the industry, proved somewhat insufficient. This discrepancy was partly due also to the very marked rise in all values since the preparation of the books was begun. Additional funds are now being raised to complete the work.

Volume I was finished in January last and Volume II appeared in April. Volume III is now practically complete and will be available very early this year. A large amount of work has been done on Volume IV and considerable has been accomplished in the preparation of Volume V. A brief description of the contents will be of interest to all of those connected in any way with the industry and a few words will be added in regard to the manner in which several communities are making use of this text in their educational work.

What the Books Contain

Volume I contains the following sections: Arithmetic, mathematical applications, how to read drawings, and elementary physics. Volume II deals with mechanics, hydraulics, elementary electricity and elements of chemistry. It will be seen that these volumes cover the requirements in fundamental mathematics and science on which any successful development of a course of instruction in pulp and paper manufacturing processes must be based. The reason for beginning the series with these subjects is that the committee set out to prepare a complete course of instruction and they appreciate the absolute necessity of a proper understanding of these subjects before a study of manufacturing operations can be successfully undertaken. One of the chief handicaps of the rank and file of pulp and paper mill workers is that they are not satisfactorily grounded in these fundamental subjects and are not in a position to grasp and develop ideas which would advance the industry and improve their own standing and earning power. These subjects have been treated very clearly and as comprehensively as necessary to give the required foundation for further study. Illustrations and examples, wherever possible, are based on actual mill experience. This immediately connects up these subjects with the mill and makes the study not only more valuable but more interesting.

The manufacture of pulp is taken up in Volume III and is covered in a more comprehensive manner than has yet been undertaken. An important feature of the volume is the wealth and the excellence of the illustrations. This is particularly shown in the first section which deals with the properties of pulpwoods, a subject which, heretofore, has not been given the attention it deserves in books written for pulp makers and pulp users. It is particularly necessary for men who would understand manufacturing processes to have a clear notion of the character of the principal raw material. In this section both the physical structure and chemical properties of wood are carefully explained. Another feature of this volume is the section on wood preparation. This takes up the various methods of barking, chipping, and screening of pulpwood and includes information on fire protection and the growth of fungi.

In the other sections on manufacture, the production of mechanical, sulphite, soda and sulphate pulps is described clearly and with a large number of illustrations of the usual equipment, with full explanation of the operation of each machine. These illustrations are not pictures used for ornament, but carefuly prepared live drawings, with parts properly designated. The treatment of pulp is a section which has to do with operations common to every kind of pulp such as screening, de-watering, pressing, drying, etc. The refining and testing of pulp is a section in two parts. Part one describes the principal types of refiners with their object and their result. Part two covers accepted methods for sampling and testing of pulp for moisture and describes methods for testing purity, cleanliness, strength, bleaching quality, etc. Bleaching of pulp covers the preparation of bleach solution from bleaching powder and by electrolysis, describes the different types of electrolytic cells and discusses the chemical principles involved in the bleaching operation.

Volumes IV and V take up the manufacture of paper, and here, as in Volume III, each section has been written by the person particularly qualified from his training and experience with the subject assigned him. Paper mill operations are assumed to begin with the preparation of rag and such other fibres as receive their initial treatment in the paper mill. The necessary equipment is fully described and the cooking and washing processes explained. The treatment of waste papers has assumed a position of great importance in recent years and the subject is adequately covered in this section. The section on beating and mixing covers the discussion of the principles, the apparatus, and the processes encountered in the preparation of the material for the paper machines. Furthermore, operations such as engine sizing, color and loading are treated in separate sections where these important considerations are thoroughly explained.

The section dealing with paper making machines is, without doubt, the most comprehensive treatment of this subject which has ever been published. The screening of stock is the first matter taken up and from this the author proceeds to the explanation of the principles involved in paper making by machine with descriptions of, we believe, every type of paper making machine. Considerable attention is given to the actual operation of the machine, with explanation of the function of each part, including figures on the various factors which influence paper machine efficiency, together with descriptions of the recently developed electric drives.

The manufacture of paper is continued in Volume V. This volume contains a description of particular merit of the process of making hand made paper and with illustrations

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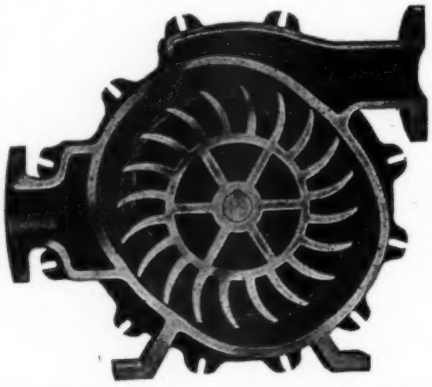

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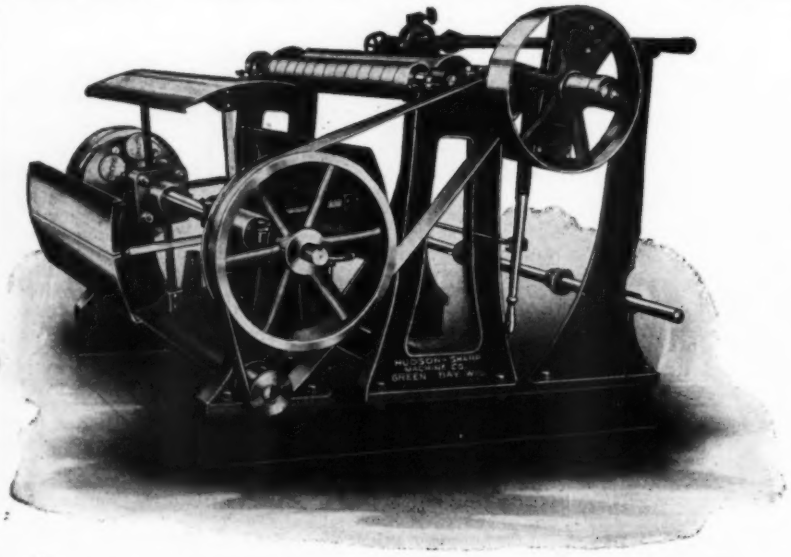

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which cannot be surpassed. This is followed by a discussion of tub sizing of paper, both in the form of sheets and in the web. The next section is on finishing operations, which includes the handling of paper from the machine to the warehouse and deals with calenders, cutters, etc. There is included a section on coated and other treated papers, such as vegetable parchment, since in a number of cases these processes are carried on in conjunction with the manufacture of the paper, and the quality of the paper is important to their success. The section on the manufacture of special papers, boards, etc., will contain information with regard to some of the special factors or special conduct of regular mill operations required to produce the desired results. Paper testing is a subject that deals not only with the methods of testing paper for the more important qualities, but incidentally furnishes considerable information on the characters and constituents of various kinds of paper. A chapter on mill organization is planned for in order that a person desiring to become acquainted with the industry can be informed as to the various departments of the mill and their inter-relation. This is particularly valuable in giving the novice a knowledge and an appreciation of the extent to which the success of the operations in one department depend upon the care with which members of the other departments carry on their work. Under general mill equipment we find treated a number of features which contribute largely to the handling of materials, transmission of power steam, etc. Provision is being made for a chapter on water and for a section on laboratory practice and the analysis of raw materils. This volume concludes with a dictionary of papers, useful tables and the like. Certain of the sections in Volume V are purposely made somewhat flexible as to scope in order to keep the size of the volumes within the limits planned and provided for by the committee and the publishers.

A feature of the books is that they are not only available as bound volumes but also in the form of study papers containing about 50 pages each, for greater convenience to the man who does not want to risk damage or loss of his bound copy and who may want to slip a study paper in his pocket to study at odd moments and to have handy in attending classes. This feature is especially designed to facilitate instruction by correspondence.

Organization of Instruction

At least five paper mill towns in Canada are conducting or planning classes in which these textbooks will be used, and there is at least one community in the United States where the first two volumes are already in use. They have also been adopted as textbooks by the Massachusetts Board of Education. The method of conducting the work and the manner in which the textbooks serve the purpose vary with the locality. So far as possible the books are sold in sets and in several cases the companies are assisting the men in purchasing them on the installment plan. The books can be purchased either bound or in pamphlet form and a mill may assist the men in purchasing pamphlets where they desire to own them or purchase the pamphlets for the mill and distribute the appropriate study papers to the men attending the classes. This practice will doubtless prove helpful, especially at plants where several classes are being conducted simultaneously. It is hardly feasible for a man working in the mill to attend more than two classes at the same time, so that the purchase and distribution of the study papers by the mill would relieve the student of having an accumulation of papers which might be lost before his school work had progressed to the point where they would all be required. On the other hand, the pamphlets are punched and can be provided with binders so that a man can equip himself with the whole set and take out for immediate use only such parts as his class is covering. The experience of the present winter will provide some interesting and valuable information with regard to the best methods of organizing classes and conducting the educational work.

Sales of the first two volumes are progressing very favorably and there is no doubt but that the excellence of the books and particularly the treatment of the manufacturing processes, will create a demand that will require an early appearance of a second edition. In view of this the committee invites prompt criticism of the work and suggestions for improvement, and, particularly, correction of any errors that may inadvertently have crept into the text.

The distribution of the books to the pulp and paper industry is carried on by the Pulp and Paper Magazine acting for the Canadian Pulp and Paper Association in Canada and by the Technical Association of the Pulp and Paper Industry and, in other fields, by the McGraw-Hill Book Company, who are the publishers.

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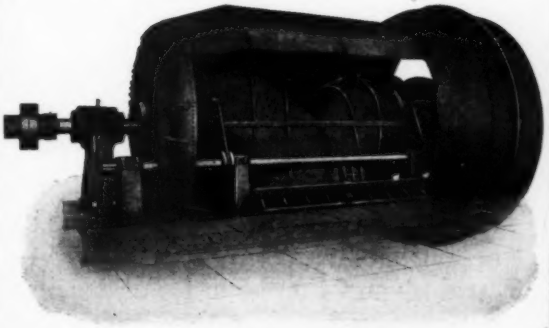

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If you use a triple effect evaporator add two effects and save 40 per cent.

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Henry W. Stokes Addresses Senate Finance Committee

Henry W. Stokes, president of the York Haven Paper Company, president of the Wrapping Paper Manufacturers' Service Bureau, and chairman of the general tariff committee of the American Paper and Pulp Association, addressed the United States Senate Finance Committee in the hearing on a tariff on paper, on December 21, 1921. He presented the basic facts of the paper industry in the United States in the following statement:

1. What the paper industry means to America.

Gradually during the past ten years the United States has become the leading paper manufacturing country in the world, and in answering the question as to what the paper industry means to America we must emphasize the fact that maintaining the leadership in the paper industry of the world means maintaining in an effective way an industry, the value of whose product in the United States exceeds annually $1,000,000,000.

To form a background for the detailed statements to be given later by representatives of particular groups of manufacturers, speaking with relation to the needs of protection for the grades of paper which they manufacture, it is desirable to give briefly a general statement of what the paper industry means to America. No attempt will be made to give detailed figures in this general statement.

In the United States, there are 818 paper and 322 pulp mills, whose product in 1920 was valued at about $1,025,000,000. The capital invested in this industry will probably be shown in the forthcoming census reports to be nearly $1,000,000,000. Paper manufacturing is not a temporary or a migratory industry. It requires an initial investment in plant and machinery of a larger amount than that required in nearly any other industry with an equal value of product.

The product of the paper mills of this country ranges from the finest types of paper, such as that used for bank notes, bonds and commercial documents, down to the building felts and paper boards. They are all related and their raw material and market problems are alike and reasonably uniform. All grades of paper are used in every community in this great country. Try to imagine a family where paper is not used in some form.

2. What the paper industry means locally.

The paper mills of this country are for the most part located back from the larger cities, near the source of raw material and of available water power. In these localities the paper industry is often the only industry upon which that community depends for its existence. The paper industry employs some 110,000 men and women in different parts of the country, and in the paper communites calls into existence stores, schools and other business and social activities making up the existence of American communities.

3. Growth of the paper industry.

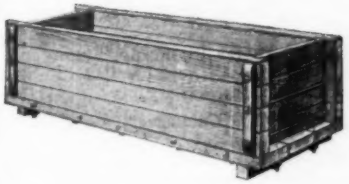
During the past ten years the consumption of paper has grown steadily, and its use is constantly widening as new uses are developed by the public and by the industry. In 1909 the production of paper in the United States' mills was 4,216,708 tons. In 1920 there was a production of 7,334,614 tons. The distribution of this production by grades is of interest. Paper or box board led with a tonnage of 2,313,449. Newsprint was second, with 1,511,968 tons. Others in order are as follows: Book, 1,104,464; wrappings, 1,403,812; fine papers, 389,322 tons; felts and building, 366,941 tons; tissue, 177,447 tons.

In the production of paper the heaviest tonnage is found, of course, in the cheaper grades, so that figures as to valuation may be of interest. Book paper produced in 1920 was worth about $220,000,000. Board values were over $200.000,000. Newsprint was worth approximately $150,000,000. and fine paper, though far less in tonnage, approximated about the same value as newsprint.

The way in which paper is coming into the daily lives of the people of this country is indicated by the increase in per capita consumption in the past few years. The paper industry has been called upon to supply these increased needs of the population, and because of the complexity of process and capital needed has found it difficult in some cases to keep pace with the increasing per capita use of paper. The per capita production of all grades of paper during the past few years is as follows:

1899	57 pounds per capita
1904	75 pounds per capita
1909	93 pounds per capita
1914	107 pounds per capita
1919	118 pounds per capita
1920	138 pounds per capita

KALAMAZOO TANKS



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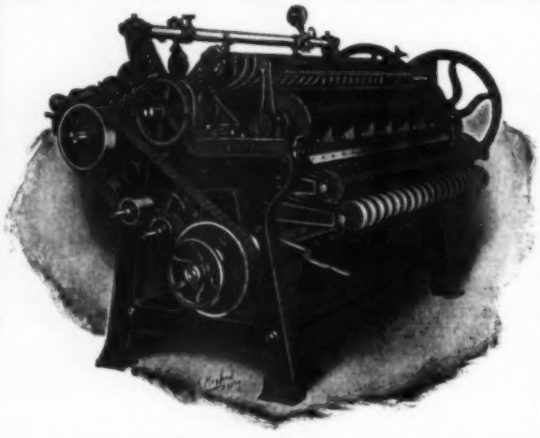

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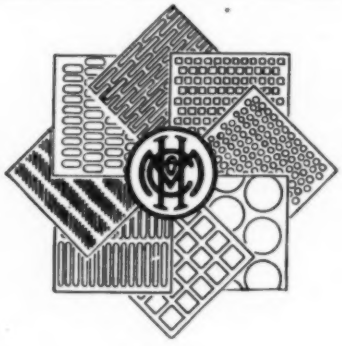

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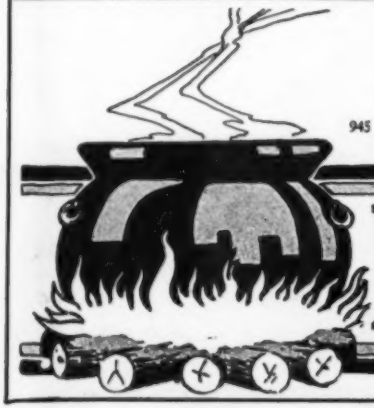

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4. Effects of the business depression upon the paper industry.

During the past year the paper industry has felt the general business depression seriously, and the falling off in tonnage production and in valuation has followed somewhat closely the average decrease in these items in industry generally. The past three or four months has been some improvement and in some grades of paper the industry is now back to 75 per cent of normal. Many grades are, however, still below 50 per cent of the customary production. No small part of the difficulties confronting paper manufacturers is the competition from Scandinavian and German manufacturers, who, with the advantage of depreciated currency, low wage conditions, low standards of living, are able to make paper at a rate which American manufacturers cannot approach. This situation, coupled with the low freight charges from Europe to our shores—for it costs less to ship a ton of newsprint paper from Europe to New York than to ship a ton of paper across the State of New York—has made the situation of the American paper manufacturer precarious to the extreme. Many book paper machines are shut down. Their market has been taken from them by European competition, and that in face of the fact that America has the largest, fastest and generally the most modern paper machinery in the world.

Because of the very large capital investment necessary in the manufacture of paper and the consequently large overhead, it is essential for paper mills to run full or very nearly full if there is to be fair profit. Such a decline in production as has come about the past year adds materially to the cost of manufacture. There has been a steady though not a sensational increase in the number of paper making machines. The capacity of the mills has been increased in a much greater ratio than the increase in number of machines. This is due to more efficient means of manufacture. The following table shows increase in number of machines and in capacity and productions:

Year	Number of Machines	Capacity	Actual Productions	Per Cent of Capacity
1899	1,232	2,782,200	2,168,200	78
1904	1,369	3,858,000	3,107,000	80½
1909	1,480	5,293,400	4,216,700	80
1914	1,540	6,439,800	5,270,000	82
1919	1,590	7,200,000	6,190,000	86
1920	1,653	8,100,000	7,300,000	90
1921	1,690	8,700,000	.....	...

5. Protection from paper manufactured abroad.

All that the American manufacturer needs at this time is reasonable protection against cheap foreign labor and against conditions arising from depreciated exchange, to be able to compete with foreign manufacturers for the home markets on equal terms. When the German workman, for instance, is employed at a wage equivalent in purchasing power to less than one-half of the wage paid in America the situation of the American manufacturer is easily realized. The paper manufacturers feel strongly that there must be some protection against foreign competition, based upon the wide divergence in wages paid in this country and in European countries. It is felt that the question of depreciated exchange is a very difficult one, and we believe that the Senate Finance Committee and others concerned with this question will develop a solution, in so far as a solution can be worked out, that will protect American industries.

December Meeting of Michigan Superintendents

About fifty superintendents and guests were present at the meeting of the Superintendent's Association held at the Park-American Hotel, Kalamazoo, Mich., on Thursday evening, December 15. N. M. Brisbois, chairman of the Michigan Division, presided. Dinner was served at 6:45 and then the superintendents adjourned to the assembly room.

Mr. Walter Gregg, of the Gregg Pump Co., Kansas City, Mo., gave an illustrated lecture on "Modern Pumping Methods in the Paper Industry." Mr. Gregg described the different methods of sinking tubular wells for paper mills which he said did away with the sand nuisance. He described different kinds of pumps showing the advantages under different conditions in the manufacture of paper. He explained how it is possible to increase the water volume from old wells from two to four times by modern pumping methods. The volume of water pumped is more important than attempting to obtain 100 per cent pumping efficiency which is an impossibility. Regarding pumping lubrication, Mr. Gregg said that four gallons of grease would run a Gregg pump a year and that no oil was used. Modern pumping practice is to drive all kinds of pumps by motors. The best method used in pump-

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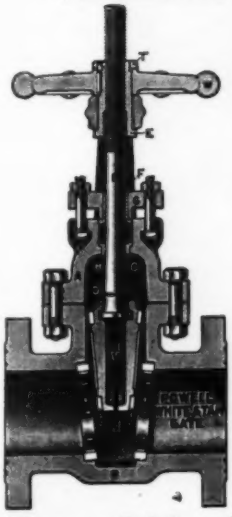

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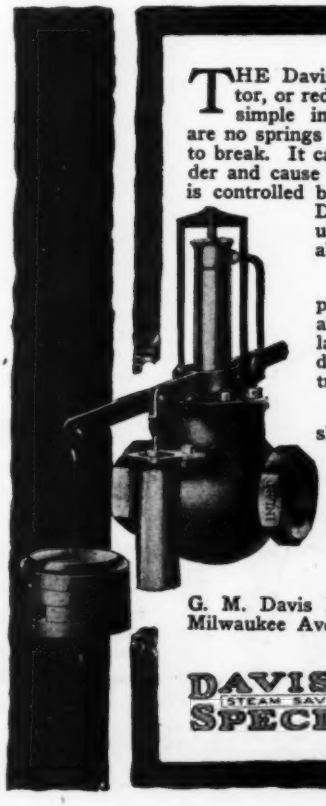

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See in your own plant how dependable the Davis Regulator is—write for details of the free trial offer.

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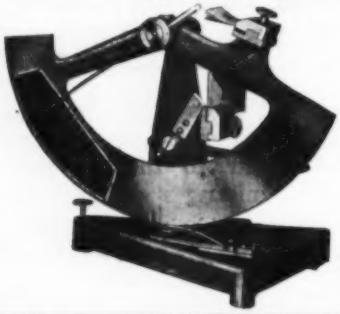

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ing water in paper mills is by using a propellor pump discharging into reservoirs with centrifugal boosting pumps. He said in estimating the efficiency of pumps or any other machinery factor of friction as developed by constant use of machinery is important. Steam pumps are being replaced rapidly by centrifugal and other more modern pumps. He explained various methods of handling water, and illustrated them with actual photographs of pumps installed in pulp and paper mills and under similar conditions.

At the conclusion of Mr. Gregg's address, the superintendents discussed the pumping problem and new facts were revealed which can be used in actual practice.

Mr. Bacon, chief engineer of Otsego, testified as to the success of the Gregg pump. He said it had saved the city of Otsego many thousands of dollars.

Mr. Keyes, of the Vegetable Parchment Company, said that the first well gave them double the amount of water with the Gregg pump than with the old system, and they had no trouble with it.

Mr. L. Q. Moffitt, of the Taylor-Wharton Iron & Steel Co., Highbridge, N. J., who was to address the meeting on "Manganese Steel," was unable to be present.

Mr. Claude Nicely, president of the LaSalle Paper Company, South Bend, Ind., addressed the meeting, extending an invitation to the members of the Michigan Division to hold their next meeting on January 21st at South Bend as guests of the LaSalle Paper Company. This invitation was voted upon and accepted.

Fourth Meeting of the Connecticut Valley Cost Association

The fourth monthly meeting of the Connecticut Valley Local Branch of the Cost Association of the Paper Industry was held on Monday evening, December 12, 1921, at the Holyoke Y. M. C. A.

The meeting was in charge of the Hampshire Paper Company and the Carew Manufacturing Company, South Hadley Falls, Mass., who had secured as the speaker of the evening Mr. Edmund C. Gause, C. P. A., of Haskins & Sells, public accountants.

Mr. Gause spoke most interestingly on "The Importance of Power Costs in Paper Mill Accounting." He also spoke briefly on some of the features of the income tax.

Following his talk a very active discussion took place, in which all present joined in questioning Mr. Gause on matters pertaining to the subject which he had discussed.

The meeting adjourned at 10:00 p. m.

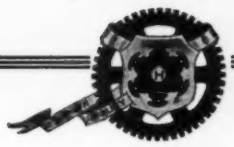
New England

Boston, Jan. 2, 1922.

Throughout the last few weeks of 1921, activity in nearly all New England paper mills slackened very perceptibly. At present conditions are improving and an optimistic tone pervades the industry throughout these six northeastern states. Box board mills have been notoriously hard hit for orders during recent weeks and the price of board dropped rapidly in New England. Several of our largest board manufacturers have been compelled to close for a week at a time owing to this sudden dearth of demand, two such instances being the mills of the Robert Gair Company at Haverhill, Mass., and Thames River, Connecticut. The price of chip board sagged until it was at the $32.50 level where a fairly respectable total changed hands. During the past two weeks, however, advances by three of the chief eastern producers to $35 and $37.50 have followed up a better demand that, however slight, showed certain indications of continued improvement. Board consumers in New England are in none too good a position insofar as orders for boxes is concerned but of them it can also be said that better days are ahead. The candy box trade received a big impetus from the Christmas trade which is now lacking of course, while the shoe box business has been severely set back during recent months by labor conditions in Lynn, Haverhill and Brockton, troubles which threaten to cause a wholesale removal of shoe manufacturers from their present locations.

The wrapping paper situation at present is devoid of feature. The advance to 7½c on kraft was effected on December 1 as the writer predicted, but no further price changes have occurred. Orders have been taken by the three chief New England mills, Brown & Co., the Claremont Paper Company and the Nashua River Paper Company, sufficient to carry them through January, according to the distributors.

The last three weeks of December saw activity among the fine paper mills almost halved in some instances, but this is



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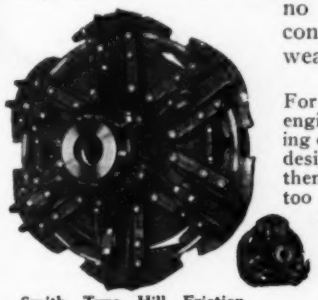

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largely a seasonal phase of the situation, and early January improvement among the mills of western Massachusetts is counted on. For a short time the rise in the price of bleached sulphite to 5c was expected to cause a stiffening in some lines of fine paper, but paper consumers in this vicinity stand opposed to price increases and merchants in more than one instance have had occasion to announce to mill sales managers that their customers would not do busines on higher price levels.

Paper Mill Supplies

Paper mill supplies have undergone a revision downward during the past month, but at the time of this writing improvement seems to be setting in apace. Waste papers slumped off materially. Folded news dropped to $7.50 at one time although today's market is fully $8.50 and mixed papers sold in large volume at $5 but since then have quickly risen to $6 and $6.50. Heavy book stock has been quoted at $1.20 f. o. b. the cars, but packers of good paper stock want $1.35 for old books. Old kraft papers dropped to $1.50 shipping point and then revived to their present level of $1.70 to $1.75. Cotton rags received a severe price setback owing to a complete withdrawal of western Massachusetts fine paper mills during the latter part of the month, but values are now strengthening on those grades. Roofing rags are selling in New England at $18 to $22 per ton delivered mills.

Manila rope has weakened, shown particularly by imports of foreign ropes at 4c ex docks against 4½c paid in November. New England chemical manufacturers report a gratifying amount of contracting of paper making chemicals on the part of the mills. It is in pleasing contrast to last year when practically all buying was from hand to mouth.

Pulpwood shows very firm tendencies. At present, quotations range from $12 to $14 f. o. b. point of shipment. While little wood is being cut in New England because heavy stocks are being carried over, nevertheless the light buying this fall and winter has jacked up values from the low point of $8 which was the nominal price quoted last summer.

Advance Co. Mill Nearly Finished

The new mill of the Advance Bag and Paper Company at Howland, Maine, has been pushed forward so rapidly that it is expected at this writing that the machinery will be installed before the end of the month, although construction only started last Ocober. The new beater and Jordan room of the mill is a one-story building with basement and is made of reinforced concrete. The slusher room will also be of one story, 24x60. The machine room is 52x288 feet in size. The bag mill will be a four-story structure of reinforced concrete and brick. The walls of the first story are of concrete and the remainder of the building is of brick and steel. Its dimensions are 150x65 feet. In the bag mill will be installed 60 modern bag machines, each of which will be operated by two girls. A tremendous capacity production of bags will be possible and it is expected that business will justify capacity operations before spring.

Improvements of other kinds to the Advance mills are nearly completed. Among them are power house extensions, improvements in the boiler room, and the addition of a 400-ton bunker and two 750-horsepower boilers. A $90,000 dam built last year and partly the property of the company will supply plenty of waterpower from the Piscataquis River which joins the Penobscot River at Howland. Chester A. Ring of Bangor, Maine, assisted by his son, Frank S. Ring, has had charge of the construction.

Arrivals of foreign woodpulps were very heavy this past month, at the port of Boston. The Norwegian steamer, Knut Hamsun brought 4,200 bales of sulphite pulp from Sweden on the 12th of December, taking some 12,000 bales on to Baltimore. The pulp landed at Boston amounted to 700 tons. The Shickshinny came here from Swedish ports during the past month with 1,300 tons of woodpulp. Owing to a strike at Portland, Maine, the large consignments of English china clay that are usually unloaded at that port have been brought to Boston. About 3,500 tons of English clay were brought to Boston in this way on the American steamer Merrymount. We understand that the John Richardson Company of Boston were the importers.

Some 4,000 horsepower has been developed by a new power plant which was recently completed at the Groveton Paper Company Mill in New Hampshire. At about the same time a new woodroom was completed at the mill.

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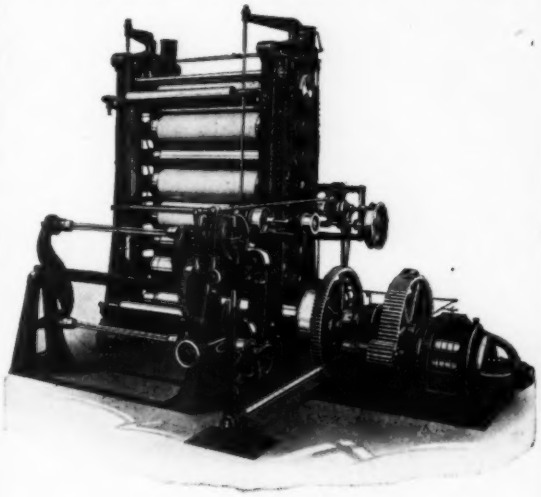

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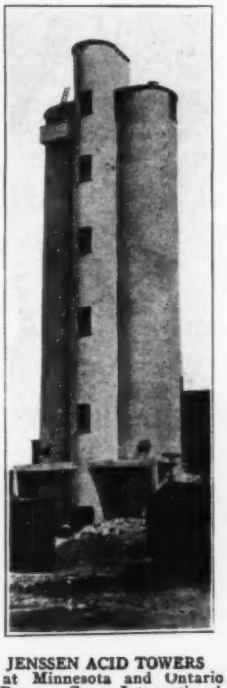

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PITTSBURGH PENNSYLVANIA

John Lambert Hobson, a founder of some of New England's most important paper mills, died on December 11th at his home in Haverhill, Mass. Mr. Hobson spent part of his life as a holder of offices of public trust in Haverhill, being connected with public institutions, banks and at one time a deputy of the Internal Revenue district. He founded the Haverhill Paper Company and later the Glen Manufacturing Company of Berlin, New Hampshire, and was active in both concerns which were managed by one company until both were sold to the International Paper Company. Later he became active in the affairs of the St. Croix Paper Company of Woodland, Maine, a company in which he was interested financially since it had been organized. Mr. Hobson's son, Arthur L. Hobson, is the present treasurer of the St. Croix Paper Company, a newsprint mill making paper largely for one of Boston's biggest daily papers. Mr. Hobson's will when filed showed public bequests to three Haverhill public and charitable institutions.

N. H. Busey, Jr., of the Smith Paper Company of Lee, Mass., was one of the representatives of the paper industry who appeared before the Senate Finance Committee recently when that committee was considering tariff rates on paper. Mr. Smith spoke for the protection of the manufacturer of india and bible paper, condensor, carbon, pottery and waxing papers. Mr. Busey presented a table showing that under the present tariff, that is the Underwood law which makes no pretense at protection, many papers would stand a higher rate of duty than under the proposed Republican protective measure. Mr. Busey's strong argument according to a special report to a Boston daily paper made a strong impression on the committee members, who certainly do not wish it said that a Democratic tariff gives more protection than that the Republican party is sponsoring.

An important mill merger concerning two Massachusetts and one New Jersey mill is announced this week. The Ideal Coated Paper Company of Brookfield, Mass., the Ware Coated Paper Company of Ware, and Samuel Jones & Company, of Newark, N. J., have been merged into a $1,000,000 Massachusetts corporation with William McLaurin of Brookfield, and John McLaurin of Ware, president and secretary-treasurer respectively. It will be known as the McLaurin-Jones Co.

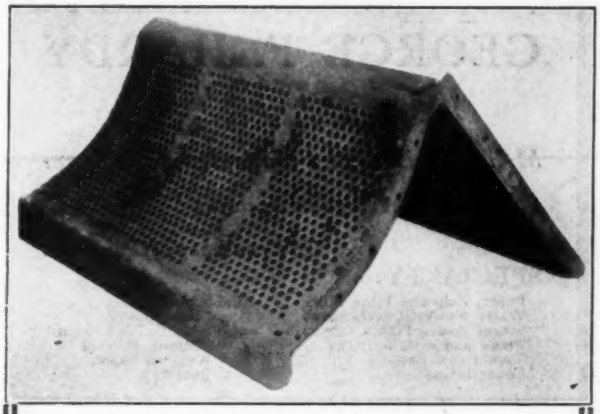
The Brookfield and Newark concerns are two of the largest gummed paper manufacturing concerns in the country, and the Ware plant makes a large part of the coated paper used by the other two mills.

George Hall, superintendent of the Mountain Mill Paper Company at East Lee, Mass., died at a Pittsfield, Mass., hospital on Christmas Eve. Mr. Hall came to this country from Scotland in 1910 and ran a machine for the Mountain Mill plant shortly after his arrival. After doing this for two years, he became superintendent of the mill. His death was directly caused by a severe accident in the mill a few days previous. He became caught in the driving gear of a paper machine. His arm and body were badly crushed and recovery was foreseen as impossible. He was held in very high regard by employers and employees.

A definite forest policy for Maine is the aim of the Maine Forestry Association, and plans are to be formulated which will provide for the perpetuation of Maine forests. A big meeting will be held in January. Paper men of the state who are contributing their personal efforts on behalf of the movement are Alfred K. Ames of the Machias Lumber Company, pulpwood cutters and dealers, H. J. Craig of the S. D. Warren Company and E. B. Draper of the Nekonegan Paper Corporation of Oldtown.

Charles E. Butterfield, vice president of the Morey Paper Mill Supply Company of India street, Boston, died in New York, December 21. Mr. Butterfield, who resides in Dorchester, Boston, had gone to New York some two weeks previous on business and contracted pneumonia while there. His death followed after a ten-day illness. He was born in 1862 in Boston, and lived for some years at Centre Harbor, New Hampshire. He has been connected with the Morey Paper Mill Supply Company for many years.

The Union Machine Company of Fitchburg, Mass., has just completed the installation of a combined Fourdrinier and cylinder machine having a width of 106 inches in the No. 1 mill of the Crocker, Burbank & Company at Fitchburg. The Union Machine Company specializes in the manufacture of highgrade paper mill machinery.



Because there are no moving parts this is a very simple but very efficient device. Patent No. 1,271,426 issued to Mr. Brownell Buehler, July 2nd, 1918.

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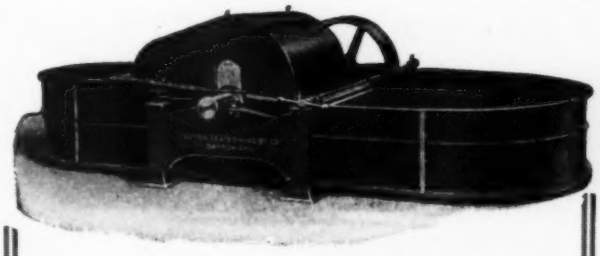

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NITRO, WEST VIRGINIA

Traffic managers of New England paper mills will probably appear at Washington to secure reduced freight rates on coal and pulpwood. A lower rate on southern china clay is also sought. At present it is impossible to use southern clay in New England owing to the freight of some $8 which makes the English clay cheaper for filler as well as coating purposes. Hearings are scheduled to start about January 9, before the Interstate Commerce Commission.

A sad and regrettable accident occurred this last week on Friday in the locomotive roundhouse of the S. D. Warren Paper Company at Westbrook, Maine, when three employees were trapped inside a boiler which they were repairing and killed by the heat of a fire. A locomotive driven by oil had been run into the roundhouse and caught on fire. The three men working near inside the boiler of a tender were suffocated by the smoke and fumes and unable to escape.

A laboratory for salesmen is part of the equipment of the Calco Chemical Company's office, in Boston, at 35 Hartford street, where they reecntly moved from quarters on Federal street. The New England office is a branch of the offices and laboratories at Bound Brook, New Jersey. The company manufactures and sells all kinds of papermaking colors and chemicals.

Frank S. Arnold, president of the Arnold Roberts Paper Company, one of New England's leading distributing houses, died recently at his home near Boston. Mr. Arnold was a founder of the company that bears his name and was well known in New England paper circles. His company has the New England agency for the famous Westvaco lines, the papers of the West Virginia Pulp and Paper Company.

The estate of Charles F. Bragg, late president of the Orono Pulp and Paper Company was filed in the Bangor, Maine, Court this month and showed a total valuation of $362,294. The real estate inventory showed 780 acres owned in certain Washington county townships. The personal estate included $269,000.

Mr. William Dickinson, Jr., has been made the superintendent of the Crane mill at Westfield, Mass. His experience consists in part of being assistant superintendent of the Crane Pioneer mill at Dalton. Regret at his leaving and appreciation of his character were expressed by employees in a gift of money.

The Swedish Steamer Wathena arrived in December with 25,000 bales of woodpulp, which were discharged at Mystic wharf, Boston. About 1,500 tons came in on the Dania and 3,500 tons are expected on the steamer St. Anthony, due to arrive in Boston about January 15.

Three high powered tractors used in transporting supplies to the Great Northern Paper Company's logging camps in the Maine woods were destroyed by a fire in the Company's garage at Rockwood, Moosehead Lake. Automobiles and accessory machinery were also lost.

Charles W. Gray, one of the founders of the New England Envelope Company at Worcester, Mass., died December 21. Mr. Gray was very highly regarded by business associates, friends and employees. He was a leading envelope manufacturer of the country.

A spark arrester and soot condenser are to be installed in the mills of the Hollingsworth & Whitney Company at Winslow, Maine. The Portland Company of Portland, Maine, will furnish the apparatus and install it.

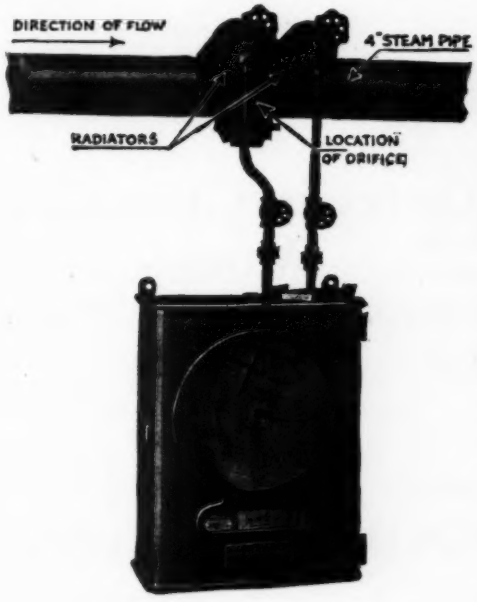
Some $2,500,000 first mortgage bonds are to be issued by the Eastern Manufacturing Company of Maine in order that dividends on the first preferred shares may be paid regularly.

Miami Valley

Dayton, Jan. 3, 1922.

Conditions among the paper manufacturers in the Miami Valley at the end of December are just about what paper men predicted one and two months ago that they would be. Many of the mills have been unable for three or four weeks to accept any orders for delivery during 1921, and had orders on their books to keep their machines going for three or four weeks into the new year. These piled up orders will carry them through the period during the latter part of December and

Bailey Fluid Meter



PRACTICAL —— ACCURATE

This shows the Bailey Fluid Meter complete for the measurement of steam. It consists of the Monel metal orifice installed between a pair of flanges, radiators and valves tapped into the pipe on the inlet and outlet sides of the orifice and pipes connecting these to the recorder.

Bailey Fluid Meters are easily and cheaply installed as changes in piping are not required and the accuracy is guaranteed.

They are the most practical and satisfactory meters for recording and integrating the flow of steam to turbines, digesters, paper machines and other processes. Steam can be measured at any pressure and temperature, exhaust steam included.

Either pressure or temperature recorders, or both, may be added to record on the same chart as the rate of flow.

Our engineering department is ready to suggest the proper equipment for your service.

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Sulphate Alumina

All Grades for Paper Mills

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Newport Acid Bordeaux B Conc.
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Two products of good coloring power for both lighter and deep shades.

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A complete line of
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part of January when jobbers are taking inventory. By the time the inventory time is over, and the jobbers know what they must order to bring their stocks up to normal again, the manufacturers will be in need of orders, and the orders will of necessity, on account of the jobbers allowing their stocks to get low to minimize the work of inventory, be forthcoming.

Orders for immediate delivery are becoming scarce, for most paper buyers know that two weeks is the least possible time in which they can expect shipment, and the time runs from that to six weeks.

At the Champion Coated Paper Company, at Hamilton, Ohio, known as the largest coating mill in the world, they are operating to capacity, without any shut down over the holidays. A number of the Miami Valley manufacturers feel that the operation of the Champion Coated Paper Company is a sort of a barometer of the market, and plan for their own mills according to what the Champion Coated Paper Company is doing. At this mill, they say that they have plenty of orders on hand to run them well into January, but that during the week between Christmas and New Years orders had slackened up a bit. Inquiries are on the increase, however, and the indications are that January will bring its full quota of business.

At the Franklin Coated Paper Company, Franklin, Ohio, they quoted last week on two of the largest inquiries they have received in some time. If their quotations bring in the business, these two orders will be sufficient to keep their four machines working to capacity for weeks. The coated paper business in this section is good.

The statement is general that inquiries are for larger and larger amounts of paper, and delivery dates are being pushed farther and farther ahead.

A few of the 31 mills in the Miami Valley shut down during the holiday week, among them the two American Writing Paper Mills, one at Excello and the other at Franklin, Ohio. The business in writings does not seem to be on the increase in this vicinity, and tissues, board and coated paper continue to have the best of it. The tissue, board and coating mills in the Miami Valley are and have been for some time operating to the maximum of their capacity. Every one of them were refusing orders during December for 1921 delivery. It is so long since such a condition has obtained in the paper business that paper men are beginning to use an increasingly optimistic tone in their voices.

The Mead Sales Company, of Dayton, has announced their new price on newsprint as 3½c, or $70 a ton f. o. b. mill, effective for the first quarter of 1922. No one in this company would venture a prediction as to what the price would be for the next quarter, but they insist that the newsprint mills of this country are losing money when they sell their product at this price.

The price of old paper such as the board mills use shows signs of going down. On December first $15 a ton was paid in the Miami Valley. During the month of December, the mills began offering $12 a ton for paper, although they admit they are not getting much at that price. Most of the board mills have stock on hand to last three or four weeks, and at the end of that time something definite will have to be done about the $12 price that is being offered.

On the whole, the expected holiday slump in the paper business has failed to appear, the orders on hand allowing the majority of mills to continue to operate until the expected influx of orders makes its appearance about the middle of January. In all lines except fine writings, Miami Valley paper manufacturers have nothing to complain of.

New Mill for P. H. Glatfelter Company

Plans for the erection of a new mill have been drawn up by George F. Hardy, paper mill architect, New York City, for the erection of a 400- by 90-foot fireproof building, which will house a new Fourdrinier book machine, Jordans, beaters, auxiliary equipment and store-house at Spring Grove, Pa.

The new book machine is designed to trim a 158-inch sheet and run 600 feet per minute, electrically driven with a sectional drive. This will be one of the largest and fastest book machines ever installed and capable of making 50 to 60 tons of paper every 24 hours.

The Glatfelter paper mill was built in 1864 and has been recently remodeled from beginning to end and is today one of the most modern plants in the east.

With the additions above outlined the present capacity will be doubled with a total tonnage of 100 tons of high grade book paper per day and the soda pulp mill of 50 to 60 tons per day.

An attractive booklet has recently been printed and sent out to the trade. The booklet contains samples of the mill's product as well as cuts showing the various processes.

SCREEN PLATES *and* DANDY ROLLS

Watermarking a Specialty

Central Manufacturing Co.
The Quick Service House
KALAMAZOO MICHIGAN

Ticonderoga Machine Works
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MANUFACTURERS OF
WARREN IMPROVED CALENDER DOCTORS
With Flexible Blades, Universal Adjustment and Control (PATENTED)
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UNION BRONZE SCREEN PLATES
(Best phosphorized Cast Metal)
Old Plates RECLOSED and RECUT to accurate gauge
UNION BRONZE SCREWS for Screen Plates
Immediate Delivery of the Largest Orders. Satisfaction Guaranteed
The Witham Screen Plate Fastener, Patented
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High Grade Printing Paper

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BOOK AND COATED PAPER
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Manufactured by

Pennsylvania Salt M'f'g Co.
PHILADELPHIA, PA.

Bleached and Unbleached
WOOD PULP
of Every Description

M. GOTTESMAN & COMPANY
INCORPORATED

18 East 41st Street **NEW YORK, N. Y.**

Established 1888

News Personals

Daniel Lewerth, heretofore with Lewerth & Culbertson, Inc., of New York, has become affiliated with Henry Lindenmeyer & Sons, paper jobbers and distributors of New York, of which corporation he has been made a director and a vice president. The business of Lewerth & Culbertson, Inc., will be liquidated. Mr. Lewerth is a widely known expert on high grade papers, and the lines which he has handled in the past will find a wider distribution through the larger organization of Henry Lindenmeyr & Sons, who are among the biggest paper jobbers in the metropolis.

Charles E. Butterfield, vice president of the Morey Paper Mill Supply Company, of 60 India street, Boston, Mass., and well known to paper manufacturers throughout New England, died on December 23 in New York while on a business trip to that city. Mr. Butterfield contracted a cold soon after arriving in New York which developed into pneumonia and he died after about a week's illness. He was 59 years old and a native of Boston.

C. Propach, lately representing the Geigy Company, Inc., has announced his intention to locate in California, either in San Francisco or Los Angeles, establishing there a business in dye stuffs, chemical and allied trades. Having covered this territory for the past twenty-five years in the interest of The Bayer Company, Grasselli and of late Geigy, he is conversant with the trade in detail, and expects to continue and increase the volume of business in this line.

Brown & Vanderhoef is the name of a new paper distributing firm in New York, organized by C. B. Brown and Alan H. Vanderhoef, both well known in the trade. Offices have been opened at 141 Liberty street, New York, and the concern will handle a full line of glassine and greaseproof papers, tissues and napkins. Mr. Brown was formerly a representative of the Kalamazoo Vegetable Parchment Company, Kalamazoo, Mich., while Mr. Vanderhoef was for several years manager of the National Wax and Paper Manufacturing Company, of Brooklyn, N. Y.

M. H. Ballou, former paper manufacturer of Ladysmith, Wis., has founded the Fairfax Bank in Fairfax, Cal., which recently opened for business. Mr. Ballou is a native of Oshkosh. For nine years he was a director of the Minneapolis, St. Paul & Sault Ste. Marie Railway. He became a resident of San Anselmo, Cal., one year ago.

Leo W. Bowmall, vice president of the American Woodpulp Corp., of New York, and secretary of the Association of American Wood Pulp Importers, sailed from New York on December 3 for Europe on one of his periodical trips across the Atlantic. Mr. Bowmall was accompanied by his bride.

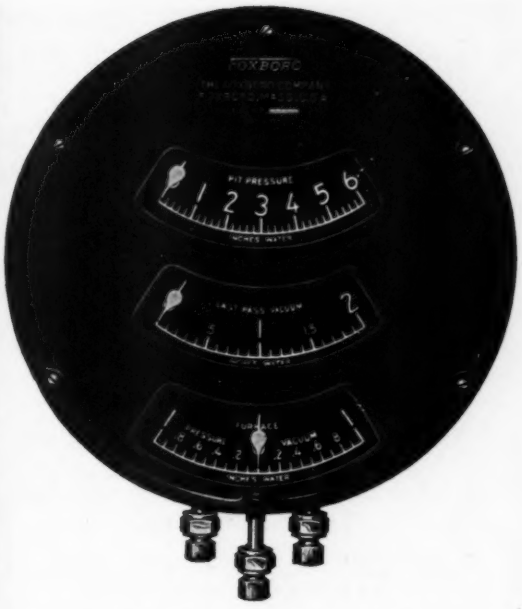
Charles H. Woods, formerly of the Holyoke office of the American Writing Paper Company, in the book paper section, is now located in the New York office of the same company at 41 Park Row.

Newfoundland Paper Industry Fostered

It has been reported according to an announcement by P. D. Reid, president of the Reid Newfoundland Company, that extensive plans for the development of the natural resources of Newfoundland, particularly the Humber River Valley, are under way.

Mr. Reid said that while in London recently he had negotiated a contract with the Armstrong-Withworth Company, Ltd. Paper mills would be established twice the size of the large Harmsworth plant at Grand Falls, Newfoundland, which supplies newsprint to the Northcliffe papers in London, with a capacity of 1,000 tons daily. Mr. Reid described the contract as guaranteeing the expenditure of $7,000,000 within two years, with the establishment of aluminum works and other industries at Grand Lake and extensive water power development.

A bulletin was recently posted at the plant of the M. & M. Paper Mill Company, Marinette, Wis., reading as follows: "This mill has now operated 100 days without a lost-time accident," a record which has probably not been equaled by any paper mill in the entire state. The wood yard has operated 293 days without an accident; the wood room, 233 days; pulp mills, 320 days; millwrights and carpenters, 272 days; steam and electric, 357 days without an accident.



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Our Latest Achievement

The TRIPLEX Draft Gauge illustrated above is our latest achievement.

It is the result of careful test and experiments and incorporates the features of durability, accuracy, legibility, compactness, and simplicity of design which mark the other instruments of Foxboro manufacture as the leaders in their field.

Note the compactness of the case. It's the same standard round form, dust-tight, fume-tight, moisture-proof Foxboro case which can be installed without difficulty where most convenient for the fireman or engineer.

The white pointers stand out in bold relief against the black background of the dial. They are easily seen at a distance. They indicate pit pressure, draft in last pass, and in furnace above the fire.

$75.00 f. o. b. Foxboro

The price of the new TRIPLEX Draft Gauge is $75.00 F. O. B. Foxboro. We also make a DUPLEX Gauge for natural draft. The price of the DUPLEX Gauge is $55.00 F. O. B. Foxboro.

Write for Bulletin BB-131 today

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New York Chicago San Francisco Tulsa
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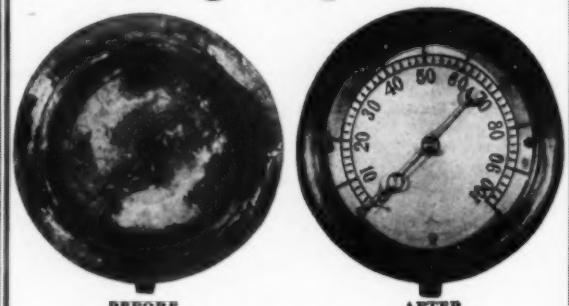
One Gauge Repaired Free



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REGARDLESS OF WHO MANUFACTURED YOUR GAUGES, Regardless of their CONDITION, we GUARANTEE to put them in First Class Working Condition

We request you to send one gauge to be repaired—no charge—as a sample of the quality and delivery of our work.

Immediate delivery of work that is uniformly excellent, at a satisfactory cost.

The Manning Gauge Company, Inc.
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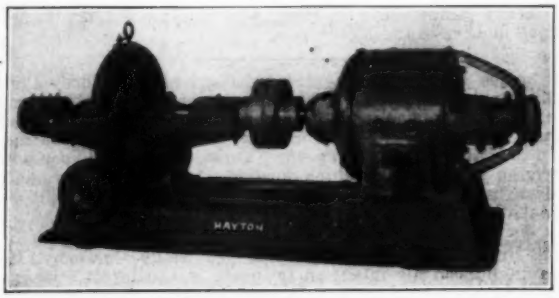
SAVE POWER and MONEY

BY USING



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"With us it is an engineering problem"

Designed especially to meet the requirements of pulp and paper mills. We do not build a pump after OUR ideas and then try to sell it to you. We make a study of YOUR peculiar problems, and then build a pump to suit your needs. Hayton Pumps are built for hard, continuous operation, and will stand up under the most severe usage. We guarantee the highest efficiency, and maximum economy in power consumption.

We also build a full line of Sandusky Triplex pumps.

Let us have your specifications for quotations

Hayton Pump & Blower Co.
Manufacturers
APPLETON, WISCONSIN

KNOW WHAT YOUR COAL BILL SHOULD BE

There's no longer any such commodity as "Cheap Coal," and indications are that there probably never will be again. At present prices, or for that matter—at *any price*—it is neither good engineering practice nor good management to check your coal by mine weights or railroad weights.

RELIANCE WEIGHING MACHINES

insure an *accurate* and *positive* check on every ounce of coal consumed. They provide a means, without additional labor cost, of checking the total received against the total purchased. They show to operator and executive the exact amount of coal consumed by each boiler. They bring efficiency and economy into coal consumption.

Weighs—records—indicates—without manual effort—the entire operation automatic.

Each machine is a unit in itself, so perfect in design and flexible in application that it will meet any existing plant conditions.

The services of our engineers are at your command in helping you plan prospective installations.

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RELIANCE WEIGHING MACHINE CO.
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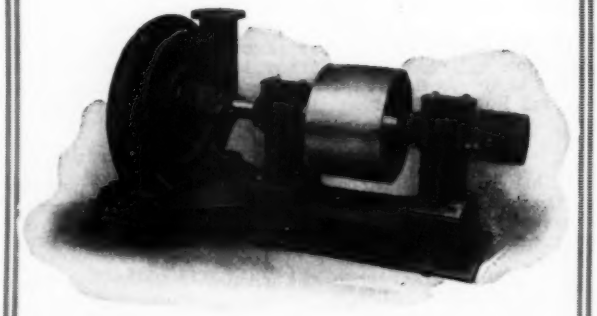
Representatives in principal cities United States and Canada

CENTRIFUGAL PUMPS

for



Water, Acid and Stock

Manufactured By

E. M. Cross Mach. Co.
BERLIN, N. H.

New Silicate of Soda Manufacturers

The Crystal Chemical Corporation has put into operation its new plant at Summitville, Ind., for the production of silicate of soda. Test runs by engineers were completed about December 1 and showed economical production costs and a product of very high quality, the company reports. The plant, with a capacity of several thousand tons, is of the most modern design and in charge of men who have spent a lifetime in the manufacture of silicate.

The P. W. Drackett & Sons Company, Cincinnati, Ohio, has been appointed sole distributor. The company reports considerable preliminary interest by the trade, indicating that the increasing demand for silicate makes a new producer welcome.

A new bulletin, N-11, published by the M. J. Dougherty Company, piping fabricators and engineers, has interesting comments on the importance of the piping system and the value of proper design and erection. In brief, concise language, easily understood by anyone, it gives the busy executive a comprehensive outline of the essentials of modern piping practice. Write to M. J. Dougherty Company, Twenty-fifth and Washington Avenue, Philadelphia, Pa.

Following the decision of the Baird-Daniels Company, Inc., of New York, to liquidate, the foreign business of the concern has been taken over by the I. C. van Itallie Company, of 90 West Broadway, New York, which has been appointed the exclusive selling agent in the United States for several well known Dutch exporters of old rope for the papermaking industry, Mr. van Itallie has had charge of the foreign business of the Baird-Daniels Company, Inc., since its inception.

Industrial Works, Bay City, Mich., is distributing free upon request Catalog No. 113, illustrating and describing the Type BC "Industrial" Crawling Tractor Crane of 20,000 pounds capacity. This crane is pre-eminently adapted to the needs of road contractors, lumber and coal dealers, gravel, sand and stone producers, foundries, railroad reclamation and storage yards, and moderate-size manufacturing plants.

Parsons & Whittemore, Inc., importers and exporters of paper and wood pulp of 299 Broadway, New York, have been appointed exclusive agents for the United States of the Finnish Paper Mill Association, which comprises all but one of the paper mills in Finland. Shipments of paper by the Finnish mills to the New York concern will commence in January.

The Imperial Pulp and Paper Corporation, formerly at 11 Broadway, is now located at 25 Broad street, New York. The company does a general export business with Japan and China in paper, pulp and other products. The office is in charge of W. L. Nederhoed, vice president of the firm, who lived in the Orient for some years.

Nilsen, Rantoul & Company, Inc., importers and exporters of paper and wood pulp of 140 Nassau street, New York, have been appointed exclusive representatives in the United States for the Diesen Wood Company, of Wiborg, Finland. The latter concern manufactures a superior grade of easy bleaching and bleached sulphate pulps.

The Combustion Engineering Corporation of New York City has opened a new branch office at 606 First National Bank Building, Pittsburgh, Pa. The new office is in charge of Mr. W. C. Stripe, formerly of their Philadelphia office.

The Holden Paper Company, manufacturers of book paper and other papers of Newburgh, N. Y., has opened a New York sales office at 501 Fifth avenue, telephone Murray Hill 8498.

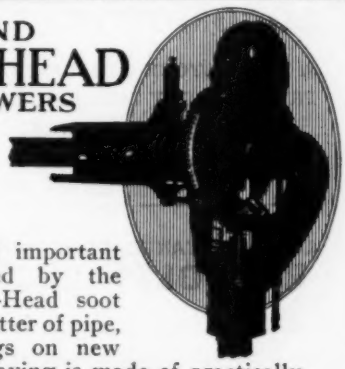
Stones quarried by the Wilkeson Sandstone Company at its quarry in Pierce county, Washington, are being used at the Camas plant of the Crown-Willamette Paper Company for grinding pulp. Eight stones have been gotten out and four of them have been running for some time as an experiment. The stones weigh three tons.

The Manchester Board and Paper Company, of Richmond, Va., are planning to erect a brick warehouse adjoining its paper mill on the west side of the canal, to cost $15,000.

Reports from mill sections in Canada would indicate that most of the mills are running to capacity. This applies particularly to the newsprint mills.

Saving 50 to 66% in the Cost of Pipe Valves and Fittings

DIAMOND
VALV-IN-HEAD
SOOT BLOWERS



One of the most important economies effected by the Diamond Valv-in-Head soot blower is in the matter of pipe, valves and fittings on new installations. A saving is made of practically two-thirds in the actual length of pipe required. The elimination of expensive individual control valves in favor of the Valv-in-Head is an important cost consideration. This decreases the initial cost of these items by one-half to two-thirds and reduces radiation losses from the soot blower lines proportionately.

On a typical six unit installation, with the independent valve system 83 feet of pipe and six 2" individual control valves are required. With the Valv-in-Head only 25 feet of 2" pipe and no individual valves are required. With this six unit installation the saving in cost of pipe valves and fittings effected by the Valv-in-Head system is approximately 64%.

The comparisons are:

Using "Bronze body valves, nickel seats and discs."

Independent valve system	$249.44
Valv-in-Head System	90.83
Saving by latter	$158.61

This is only one of eleven important advantages of Diamond Valv-in-Head soot blowers. Others include savings in steam, labor, maintenance, increase in cleaning efficiency, etc.

From an operating standpoint the Diamond Valv-in-Head soot blower is a tremendously better investment than the independent valve soot blower. Among Valv-in-Head operating economies are:

1. **STEAM FOR OPERATION:** Saving of 50 per cent.
2. **LABOR FOR OPERATION:** Saving of 50 per cent.
3. **MAINTENANCE:** Saving of 25 to 50 per cent.

Once installed Diamond Valv-in-Head soot blowers pay for themselves in a few months.

Every boiler needs a mechanical soot blower, and you will save money by buying the best.

Ask for your copy of Bulletin 297, describing the New Soot Blower.

DIAMOND POWER SPECIALTY COMPANY
Detroit, Michigan

Diamond

SOOT BLOWERS - SAVE 4 to 8% FUEL

RETURN TUBULAR LOCOMOTIVE **BOILERS** WATER TUBE SCOTCH MARINE

A LARGE STOCK OF HIGH-GRADE BOILERS OF PRACTICALLY ALL SIZES, TYPES AND MAKES, TAKEN OVER FROM DU PONT CHEMICAL COMPANY'S AND OTHER PLANTS WITH PRODUCTION RECORDS — RECONDITIONED, OFFERED SUBJECT TO ANY INSPECTION, AVAILABLE NOW!

"SAVE TIME AND MONEY ON YOUR POWER INSTALLATION — LET **DAVIS** FURNISH THE BOILERS"

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Guaranteed Perfect

Draper Hollow Balanced Brass Balls

FOR STUFF PUMPS

Absolutely balanced; will not pound out of shape

Specify these when ordering new pumps.

Order these to replace worn-out balls.

We also manufacture—

SOLID BRASS BALLS
IRON AND STEEL BALLS
BALL CHECK VALVES
VALVE FACING TOOLS

The Draper Manufacturing Co.

Port Huron, Mich. Petrolea, Canada

Every ball bears our registered trade-mark

Books on Paper Manufacture

Subscriptions are being taken for the new Textbooks on the Manufacture of Pulp and Paper of the Joint Committee on Vocational Education of the Pulp and Paper Industry, a complete set of which should be owned by every firm or individual connected with the industry.

The set will be complete in five volumes. Volumes I and II deal with arithmetical operations, elementary mathematics, drawings, etc. Volumes III, IV and V, to be issued shortly, will deal with pulpwoods and their preparation; manufacture of pulp; analytical methods; and paper manufacture in all its aspects.

Volumes I and II are now on sale at $5.00 a volume. In the selection of classroom problems bearing on the principles and practice of pulp and paper manufacture they represent the highest standard in textbook publishing.

Orders, with remittances, will be filled by the Technical Association of the Pulp and Paper Industry, 18 East Forty-first Street, New York.

WYCKOFF WOOD PIPE

PRESSURE PIPE THAT NEVER BURSTS.
Built in sizes 1 inch to 48 inches.

The Paper Industry is successfully using thousands of feet of this Pipe and they find it to be the best conveyance for Paper Stock and Acids that can be obtained.

The Pipe of Service

DURABLE—ECONOMICAL—EASY TO INSTALL

Built of selected Canadian White Pine. Wyckoff Wood Pipe is wound with steel bands whose tensile strength is 58,000 to 65,000 lbs. per square inch. The experienced engineer selects a pipe of proven dependability. Wyckoff Wood Pipe, during the past 65 years, has built a reputation that stands the keenest competition. It has been, during this time, the choice of the largest pipe users in the world. We also manufacture a high grade underground steam pipe casing.

Write today for catalog and prices

A. Wyckoff & Son Company

1855 Elmira, N. Y., U. S. A. 1920

Foreign Trade Opportunities

The purchase is desired by a mercantile firm in Switzerland of caustic soda. Quotations should be given f. o. b. American ports or c. i. f. place of destination. Reference. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 374.

A firm of commercial agents in India desires to secure the representations of manufacturers for the sale of carbon papers. No reference given. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 388.

A Government department of an island of the Dutch East Indies desires to purchase stationery and supplies such as paper, stationery and twine. Quotations should be given c. i. f. Dutch East Indies port. Payment, cash against documents through Java bank. Samples of the stationery and twine desired were forwarded and may be examined at the Bureau or its district offices. (Refer to file No. 39995.) For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 393.

A mercantile firm in Manchuria desires to purchase large quantities of old newspapers. Quotations should be given c. i. f. Manchurian port. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 407.

A firm of importers in Sweden desires to secure the representation of manufacturers or wholesalers of machinery, particularly machinery and machine supplies for paper and pulp mills. Quotations should be given c. i. f. Swedish ports. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 408.

An importing firm in China desires to secure the representation of American exporters for the sale of paper, especially cheap newsprint paper. Payment to be on basis of outright purchase against letters of credit. No reference offered. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 438.

A merchant in Mexico desires to purchase and secure an agency for the sale of stationery. Quotations should be given f. o. b. Manzanillo. Cash to be paid. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 463.

An importer of sulphur in France desires to secure an agency for the sale of that product in large quantities. Quotations should be given c. i. f. French port. Reference. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 465.

Standard Ultramarine Blues

For the Paper Industry

ASK FOR SAMPLE OF

NEOS R BLUE

The Highly Alum-Resisting Ultramarine

AGENTS

E. M. & F. WALDO, 10 High Street, Boston, Mass.

THE WESTERN PAPER MAKERS CHEMICAL COMPANY

Kalamazoo, Mich.

Manufactured by

THE STANDARD ULTRAMARINE CO.

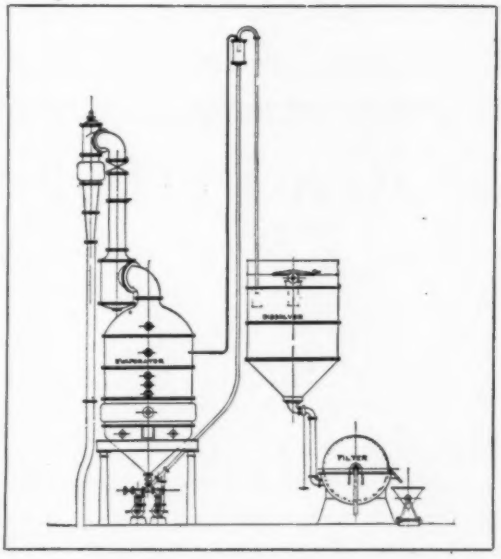
Huntington, West Virginia

Apparatus for Continuous Removal, Filtering and Washing of Precipitated Salts from Evaporators

Particularly desirable for use in connection with diaphragm cells

THIS apparatus, backed by a number of years of successful service, is intended to make what is now generally an intermittent operation continuous, and in a large sense automatic. Moreover, the apparatus is of a character requiring no more attention than can be given it by the man in charge of the evaporator. In other words, it can be operated without extra labor.

One of the most important features is that it permits continuous operation of evaporators



without periodic drawing off and refilling, consequently it contributes to minimum steam consumption by doing away with the intermittent cooling and reheating of batch charges as drawn into the evaporators.

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1922 Is a Year for "Go-Getters"

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We're ready now with the best service, most efficient organization and most attractive prices on

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EXCLUSIVE MAKERS OF

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Unbleached Sulphite 50 tons daily
Kraft Pulp 50 tons daily

Our pulp is made from Canadian Spruce
We ship in sheets, baled

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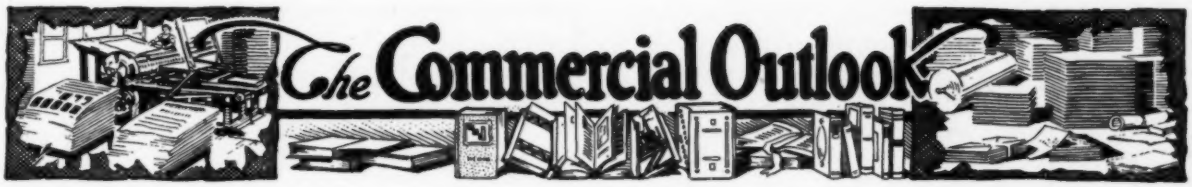

New York, Jan. 3, 1922.

NOW that the holidays are over and a new year has been started, everything points to an early revival of trade activity in the various kinds of paper. Sentiment throughout the trade is very confident. There is scarcely anyone connected with the paper industry who does not look for good business in 1922, and a majority expects the market to open up to normal proportions in the very near future. Certainly there are numerous indications that these expectations will be realized, and one of the most encouraging features of the present situation is that everyone is so bullishly inclined in their views, because if conditions run true to form, this confident sentiment should go a far way in aiding the return of business activity.

The past month has been rather quiet in most branches of the paper trade. With two or three exceptions, all kinds of paper have not been in as large demand as prevailed during October and November, yet this condition was characteristic of the last month of the year and caused little or no surprise to manufacturers or jobbers. Business in paper invariably slows up toward the end of the year. Consumers are busy taking inventory and in putting their plants in shape for the new year, and therefore limit their buying to cover immediate requirements. Paper mills mostly close down for the final couple of weeks of the year for repairs and inventories, and paper producers are not concerned over the let up in trade activity. The industry during the last several weeks therefore has been largely marking time, preparing for the new year and for the appreciable increase in business which it seems sure will develop in due time.

Several divisions of the trade have felt the slowing down of demand but slightly if at all. News print has continued in a very lively market position. While figures are not yet available, the probabilities are production of print paper last month exceeded that of November and October, when sharp increases in output were scored over previous months. Consumption of newsprint undoubtedly reached a new high mark for the year in December, which, of course, kept mills busy turning out enough paper to supply publishers' wants. Newspapers in New York printed larger issues than ever before—several new records being established in the numbers of pages in single issues—this being due to the tremendous amount of advertising by department stores and other merchants during the pre-holiday season.

Statistics for November compiled by the News Print Service Bureau are illustrative of the marked improvement made in the newsprint industry during the last several months of 1921. The average daily production of newsprint by mills in the United States and Canada reporting to the Bureau amounted to 78.1 per cent of the average daily output during the three months of greatest production in 1920, allowing for new machines recently started. Production in November of all the mills reporting was 3,011 tons or 2 per cent more than in October, a total of 159,855 tons being produced, with shipments totaling 158,406 tons.

Wrapping papers also have been in a comparatively active market situation during the last several months of the year. The pre-holiday season is usually a lively period for wrapping paper, when consumption, along with that of newsprint, mounts, and this branch of the paper industry shared in the pre-Christmas activity to its full proportion this season. Tissues have been fairly active and fine papers have continued to move regularly with very little falling off of demand.

Figures mean a lot to paper manufacturers, and the Federal Trade Commission shows in its monthly review of the paper industry that production of all classes of paper in October and November was better than normal—based on reports covering the last three years. A total of 542,408 net tons of all grades of paper and paper board was produced by United States mills in October, thereby setting a new record of output for the year 1921 far above the 477,926 tons produced in September, the next best month of the year up to October. November production reached a total of 538,876 net tons, or within close proximity to the preceding month's output, and when it is considered that the paper mills of the country have produced an average of 533,125 tons per month for the past three years, including the banner year of 1920, it can be seen that manufacturing activities in the paper industry have not only reached normal but have done slightly better. It is likely that the December production figures for all grades will be a little under those for the two preceding months but that is to be expected; it is also quite probable that production during the first several months of 1922 will even exceed that of October and November last, if present indications prove accurate.

These indications, at the outset of a new year, are most favorable and highly gratifying. Advertising in the daily newspapers, in magazines, in trade periodicals and in various other publications is showing a gradual though steady increase. Any paper manufacturer knows what this counts in behalf of his product. Retail business is improving the country over; this means a greater consumption of wrapping, tissue and other kinds of paper and box board. Business houses in common are using more and more paper in their efforts to stir up trade, more letters are being written, more circulars printed and more catalogues issued; all of which is making for a larger consumption of paper. As business generally improves, the paper industry moves along on the crest of the wave of increased activity, because the paper industry is dependent on virtually all other industries. It is putting it rather mildly therefore to say that from now on steady and healthy improvement should be noted.

On January 1 new prices on newsprint became effective, the contract basis on roll newsprint in carload lots now being 3.50 cents per pound or $70 a ton f. o. b. mills. Leading domestic manufacturers as well as those in Canada recently announced an advance of half a cent per pound in the price of No. 1 kraft wrapping paper to 7.50 cents at mills. Tissues are firm at a quotable basis of around 90 cents a ream on No. 1 white tissue, 20x30 inches. Fine papers rule steady in price, with the tendency in an upward direction. Book papers have been rather easy and some mills have cut prices in certain instances to obtain orders, though an average of quotations continues to be around 6.50 cents a pound on machine finished book. Boards are steadier than in some time. Container box boards are firm and in good demand, folding box boards are meeting with a steady sale, and plain boards show more trade activity and a stiffening price trend.

Western Conservationists Adopt Resolution

Renewed support has been given to the campaign for adequate forestry legislation by the Western Forestry and Conservation Association, which, with the American Paper and Pulp Association, has a membership in the National Forestry Program Committee, which is supporting the Snell-McCormick bill for federal co-operation with state and private owners of forest land for the maintenance of continuous forest production. In instructing E. T. Allen, its member on the national committee, as to the attitude he shall take in the Congressional forestry hearings beginning January 9, the Western Forestry and Conservation Association adopted the following resolution:

This conference of the forest interests of the five Pacific coast forest states representing lumber and timber organizations as well as forestry agencies, unanimously approves the co-operation of Federal, State and private interests in formulating and carrying out a far-seeing and comprehensive national forest policy under the principles embodied in the Snell-McCormick bill.

We recognize both public and private responsibility for prompt and sincere steps toward the ends mentioned, and urge support of this bill in its present form or as it may be modified better to secure such ends. Particularly we emphasize as of earliest importance its features for extending to all permanent forest land the adequate fire protection which must underlie all forestry effort and for the extension by purchase and exchange of public ownership of forest land.

The Oakland mill of the American Writing Paper Company, Manchester, Conn., has been reopened after having been closed for a year. All former employes were hired.

ESTABLISHED 1895

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INCORPORATED

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PENN PAPER & STOCK CO.

Assorted Waste Paper in Large Quantities

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RUSS GELATIN CO.
Factory—WESTFIELD, MASS.

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LARGEST SPECIALISTS IN AMERICA ON
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Wanted—Back Numbers of The Paper Industry

We are in need of copies of The Paper Industry, issues of February and September, 1921. We will pay twenty-five cents per copy for any of these issues sent us. Thank you. Mail direct to the office of

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Out of the forty different kinds of paper stock graded in our many large warehouses, you are assured a steady, reliable source for procuring raw materials in practically every branch of paper making.

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Papermaking Rags

Activity in the papermaking rag trade during the last several weeks has been of exceedingly narrow compass. Few paper mills have been in the market as buyers excepting for limited parcels of rags, and the situation has been almost entirely devoid of feature. This condition is not uncommon for the rag market toward the close of the year. Paper manufacturers invariably drop out of sight as buyers during the holiday period and for some days prior to that time, being more concerned over keeping raw material stocks down for the year-end inventory than in increasing their holdings of rags or other materials. It is usual under such circumstances for prices to sag, and this has been the case this year. Quotations on nearly every grade of rags are lower at present than for two or three months, and there are numerous signs that consumes can readily buy in some quarters at further recessions from the prices asked by dealers and packers, though indications are, too, that values have gradually worked down to about as low as they are likely to go in the present movement. In fact, the price position today is such that it would require only a slight increase in demand to send quotations upward, and it should be said on behalf of those on the selling end of the trade that a good many holders of rags are not pressing mills to buy, but are pursuing a waiting policy in expectation of a much broader demand and higher prices soon after the turn of the year.

Chief activity of late has been in roofing stock. Indications are that some felt paper manufacturers have been quietly purchasing rags against forward requirements, and the placing of numerous orders for small quantities has kept this branch of the trade on the move. Prices on roofing rags have receded along with other grades but there has been a relatively better movement of them, and the market appears to be more sold up on satinets than any other grade of rags. Current quotations on No. 1 satinets range between 90 cents and $1.15 per hundred pounds at shipping points, depending on the part of the country in which purchases are made, while No. 2 packing is selling at 80 cents to $1 per hundred pounds.

Opinion in the trade is that roofing stock presents more possibilities of profit during the next few months than any other class of papermaking rags. This is based on the tremendous increase in building operations throughout the country, with a proportionate heavier consumption of building paper, and rag dealers look for felt paper mills to come actively into the market in the near future. However, roofing stock is the last grade of rags which packers store, because of their bulk, and there are no signs of any large accumulations of roofing material in any quarter unless among some of the large dealers in the Middle West who handle rags in heavy volume and who generally effect sales to mills of large tonnage.

New cuttings have gradualy moved lower in price and are in slack demand at present. No. 1 white shirt cuttings are quoted at 9.50 to 10 cents per pound, and could probably be obtained in some quarters at lower figures. Paper mills are buying few washables, one reason for which, it is said, is that these rags are hard to bleach since cotton weavers are again using German dyes.

Average quotations f. o. b. shipping points follow:

New Stock—	New York and Chicago
White shirt cuttings, No. 1	9.50-10.00
White shirt cuttings, No. 2	6.00- 6.25
Fancy shirt cuttings	5.75- 6.00
Washables, No. 1	3.75- 4.00
Unbleached muslins	8.50- 8.75
White lawns	8.25- 8.50
Overall cuttings, blue	6.00- 6.50
Black silesias	3.00- 3.25
Old Stock—	
Whites, No. 1 repacked	5.00- 5.50
Whites, No. 2 repacked	3.25- 3.75
Whites, house soiled	1.60- 1.80
Whites, street soiled	1.40- 1.60
Lace curtains	4.00- 4.25
Thirds and blues, rough	1.25- 1.40
Black stockings	2.00- 2.25
Thirds and blues, repacked	1.75- 2.00
Cotton canvas, No. 1	3.50- 3.75
White cotton hatting	1.75- 2.00
Roofing, No. 1	.90- 1.15
Roofing, No. 2	.80- 1.00

Rope and Bagging

Notwithstanding that importations of old rope in recent months have increased to a substantial extent, the market for this commodity remains firm and offered supplies are meeting with a ready sale among paper mills. Dealers place much stress on the light supplies of rope received from domestic sources, it being said that with shipbuilding operations at a low point, oil well sinkings few in number, and other industries wherein most of the old rope is produced having slowed down, not much old rope is available, with the result they are firmly insistent on the prices quoted when making sales. Old manila rope in round lots and in No. 1 condition is bringing around 5 cents per pound at shipping points, and reports generally state that papermakers are absorbing practically all the rope to be had without objecting to prices. Mixed strings also are in steady demand and are selling at about 90 cents a hundred pounds at dealers' points.

Old bagging continues to be neglected by buyers excepting for occasional purchases made by tissue and bag paper mills. The volume of such transactions is small and stocks of scrap bagging appear to be heavy. Between 90 cents and $1 a hundred pounds is the quotable range on No. 1 scrap bagging.

Quotations f. o. b. shipping points are:

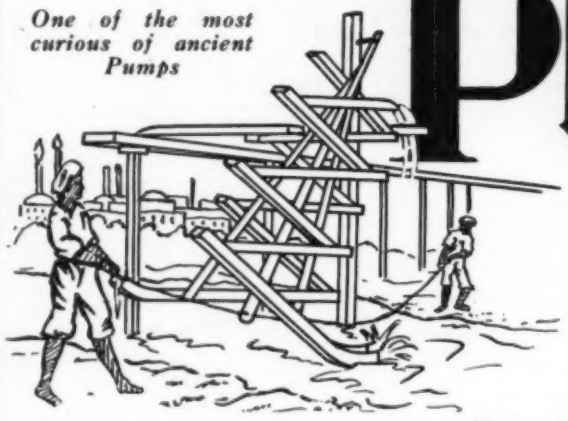
	New York and Chicago
Gunny, No. 1 domestic	1.10-1.25
Gunny, No. 1 foreign	1.00-1.15
Scrap bagging, No. 1	.90-1.00
Roofing bagging	.60- .70
Wool tares, heavy	1.50-1.75
Wool tares, light	1.25-1.50
Manila rope, No. 1 foreign	4.75-5.00
Manila rope, No. 1 domestic	4.75-5.00
Sisal strings	1.50-1.75
Mixed strings	.85-. 95

Old Papers

It is customary for demand for waste paper to dwindle down to almost nothing during the final several weeks of the year, and the market situation recently has been truly characteristic of the season. There has been little call for any grade of old paper. Business has been done, of course, in all grades, but buying has been so limited that packers have found stock accumulating on their hands in most cases, with the obvious result that prices have tumbled. Box board mills invariably experience a dull period during the holidays and a majority of them close down until orders for board from paper box makers begin to come in during January, and thus one of the principal consuming outlets for waste paper is cut off. Book paper mills have kept mostly out of the market of late, and only light buying has been done by fine paper, wrapping and felt paper mills.

When all the ruling circumstances are considered, high grades of old paper have held fairly steady in price. This is due partly to the fact that production of such grades has been curtailed, owing to reduced operations of print shops, book binderies, etc. On the other hand, low grades such as mixed paper, folded newspapers and manilas, which are collected through house to house or office to office rounds and which have not decreased in supply excepting where collectors have stopped gathering paper, have moved downward in value to a level where there cannot be much profit for packers in sales to consuming mills. Folded newspapers have sold in the East at 45 cents a hundred pounds and No. 1 mixed paper at 35 cents, which prices hardly pay the cost of collecting at the wages laborers have to be paid today. There has been a sharp drop in old kraft paper, which has receded to 1.50 cents, which prices hardly pay the cost of collecting at the news cuttings have moved down to 1.65 cents a pound. Old books and magazines rule moderately steady at from 1.20 cents upward, depending on the tonnage wanted and the part of the country in which purchases are made.

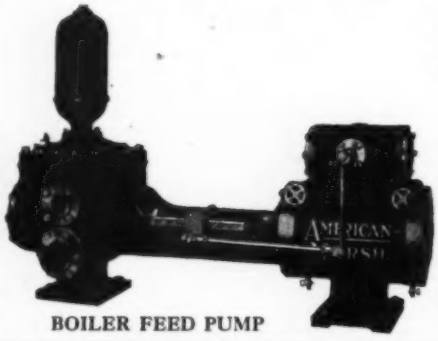
One of the most curious of ancient Pumps



PUMPS

THE ancients had many peculiar schemes for making water run uphill, but none of them more peculiar than the Indian Rocking Pump. Two men and a rope furnished the "power." The water was rocked upward from one gutter to another, until it was finally emptied into a long trough and carried to the land.

To say the least, the Rocking Pump was indirect and circuitous. Unlike modern American-Marsh Pumps—**which go straight to the heart of difficult pumping problems**—it was slow, wasteful, and roundabout.



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American Steam Pump Co.

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Chicago Office
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The American-Marsh line also includes Centrifugal Pumps, Power Pumps, Air Compressors, Vacuum Pumps, Condensers, Deep Well Engines, Stock Pumps

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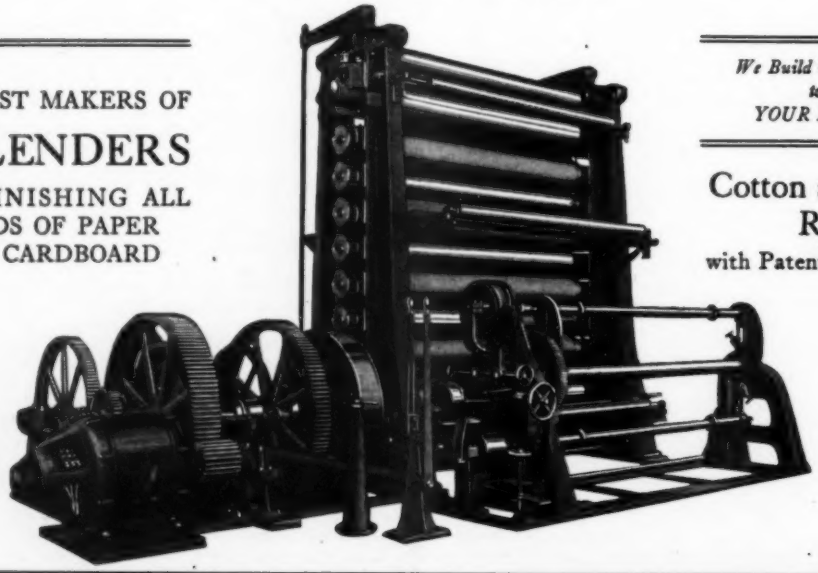
MAKERS OF

Improved Machinery for Wood Pulp, Paper Mills, Paper Converters, Printers and Lithographers

LARGEST MAKERS OF

CALENDERS

FOR FINISHING ALL KINDS OF PAPER *and* CARDBOARD



We Build Our Machinery to Meet YOUR Requirements

Cotton and Paper Rolls

with Patented Fastenings

Shavings are probably the firmest item in the market and packers are said to be frequently refusing mill orders at prices which fail to measure up to their ideas of value. No. 1 soft white shavings are quoted at 3 cents a pound upward, and hard white shavings of No. 1 quality at an average of 3.75 cents.

Quotations f. o. b. shipping points are:

	New York and Chicago
Hard white shavings, No. 1	3.65-3.85
Hard white shavings, Nos. 2-3	2.50-3.00
Soft white shavings	3.00-3.25
Colored shavings	1.50-1.75
Heavy book, No. 1	1.20-1.40
Crumpled, No. 1	.90-1.00
Ledger stock	1.65-1.85
Kraft, No. 1	1.50-1.65
Manilas, No. 1	.80- .90
White blank news	1.65-1.75
Overissue news, No. 1	.65- .75
Folded news	.45- .55
Mill wrappers	.60- .70
Box board cuttings	.45- .50
Mixed paper, No. 1	.35- .40
Common paper	.25- .30

Chemical Pulp

Chemical wood pulp prices are quite firm in tone and there is an almost total lack of selling pressure in the market notwithstanding that demand from consuming quarters has been rather slow during the last several weeks. Producers and dealers seem to feel that the quieter market is nothing more than temporary, due to the year-end period of dullness when paper mills are slowed down for inventory and repairs and when buyers are disinclined to augment their stocks of pulp, and are mostly pursuing a waiting policy in the firm belief that good business and steady prices are ahead.

Leading domestic and Canadian producers continue to quote between 5 and 5.25 cents per pound on No. 1 bleached sulphite, with secondary grades priced at around 4.50 cents f. o. b. pulp mills. On the whole, there is a fairly steady movement of bleached sulphite. Paper manufacturers are taking supplies on contract regularly, and there are enough spot sales to give the market a moderately active complexion. Kraft pulp also is in comparatively good demand and is selling at between 2.75 and 3 cents a pound at producing mills, with the largest single producer said to be sold up for several months at 3 cents. Easy bleaching sulphite is firm, as would be expected with bleached sulphite quoted at present prices, and is commanding around 3.50 cents per pound. Bleached soda pulp is steady in price at from 4 to 4.25 cents, and news grade sulphite is moving consistently if not in large volume at from 2.50 cents upward.

F. o. b. pulp mill quotations follow:

Bleached sulphite	5.00-5.25
Easy bleaching sulphite	3.25-3.75
Unbleached sulphite, No. 1	2.75-3.00
News grade sulphite	2.50-2.75
Soda pulp, bleached	4.00-4.25
Mitscherlich, unbleached	3.50-3.75
Kraft, No. 1	2.75-3.00
Screenings, refined	.80-1.00

Mechanical Pulp

Ground wood is in a firm market position. Consumers are buying in a rather cautious manner, generally limiting their orders to tonnage directly required, yet in the aggregate a fairly large amount of pulp is moving. The strong feature in mechanical pulp is that stocks are light. Producers have, on the whole, less than average amounts on hand, and have for some time been hampered in their operations by low water in mill streams, whereas consumption of ground wood has steadily mounted for the last two months or since paper manufacturers have increased their output of newsprint.

In these days of high freight rates, the fairest way to quote ground wood is on a delivered consuming mill basis, which at present ranges between $40 and $43 per ton for prime spruce pulp, freshly ground. This means that grinders are obtaining from $30 to $35 a ton for their pulp f. o. b. producing plant, depending on location and the distance to the consuming mill. Canadian pulp grinders are quoting between $26.50 and $30 a ton f. o. b. shipping points, with the reputed largest producer in the Dominion naming a price of $27.

Chemicals

Papermakers' chemicals are moving rather slowly insofar as regards spot sales. There is a more or less steady movement on contract, and consumers of course have placed a

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presents a perfect wrapping paper, weight and strength for each wrapping purpose. Made in all weights from 15 pounds to 100 pounds basis. The one complete, standardized and economical line of wrapping paper sold.

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for SAVEALLS
GROUND WOOD WET MACHINES
WATER FILTERS
SULPHITE WET MACHINES

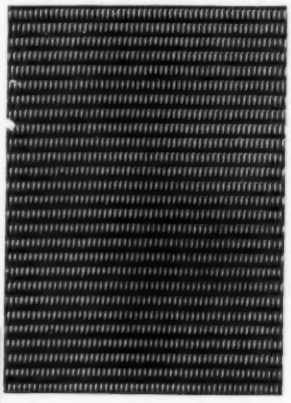
Tyler Corduroy Cloth, for use in the paper making industry, has four distinct advantages over other types of screen, namely:

1—It eliminates the necessity of using backing wires.
2—it gives much longer life than fine face wire.
3—There is no chance for stock to collect between the two covers which occurs where a fine wire and a backing wire are used.
4—Eliminating the backing wire, saves considerable time in applying the cloth to the machine.

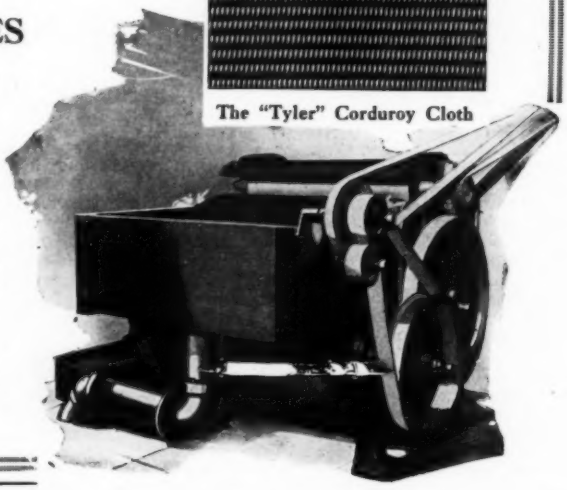
Tyler Corduroy Cloth is made from phosphor bronze, monel, or nickel wire, and is carried in stock in all widths up to and including 150 inches.

Samples will be sent upon request.

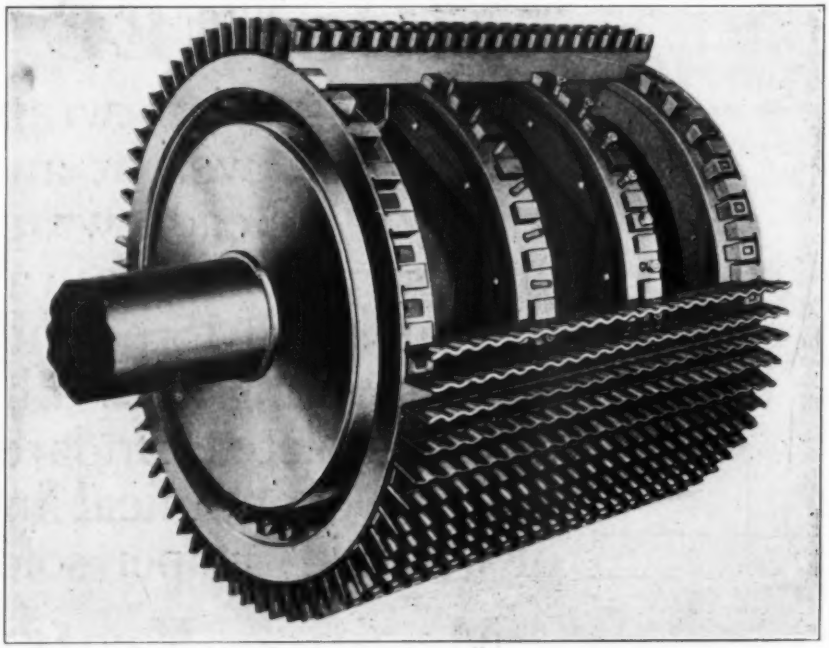
Also Manufacture Fourdrinier Wires, Cylinder Faces, Washer Wires, Backing Wires



The "Tyler" Corduroy Cloth



THE W. S. TYLER COMPANY
CLEVELAND, OHIO



Ten Advantageous Points

1. Slotless bars which means no broken ears.
2. A bar designed for maximum strength.
3. Lugs on heads machine finished insuring a perfect fit.
4. Bars require no shimming.
5. Wedges self centering.
6. Wedges drawn down by heavy wrought iron bolts with brass nuts.
7. Nuts locked by ribs on cover plates.
8. Damaged bars can be replaced without disturbing the others.
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10. Roll can be refilled in one-fourth the average time.

DAYTON GLOBE BANDLESS BEATER ROLL

WE SOLICIT YOUR INQUIRIES

DAYTON GLOBE IRON WORKS, **Dayton, Ohio**

good many contracts recently for supplies over the new year, but the average paper or pulp mill is getting along with contract deliveries at present in such a way as to preclude the necessity of entering the spot market. Quotations hold fairly steady with no changes of importance recorded. Producers in numerous cases have reduced their output pending a broadening of demand, which aids in sustaining prices. Quotations are about as follows:

Alum, lump ammonia	3.50- 3.75
Alum, lump starch	4.00- 4.25
Blanc fixe, powdered	3.25- 3.50
Bleaching powder (domestic drums)	2.00- 2.50
Brimstone (ton)	16.00-17.50
Casein	7.00- 8.50
Caustic soda, spot delivery	3.75- 4.25
China clay, domestic washed	8.00-10.00
China clay, foreign	15.00-20.00
Rosin, grade E	5.85-
Satin white	2.00- 2.25
Soda ash, 58 per cent light (bags)	2.00- 2.25
Sulphite of alumina, commercial grade	1.75- 2.00
Starch, papermakers', in bags	2.20- 2.40
Talc (ton)	15.00-18.00

Revenue Act Changes

An interesting review of some of the important changes in the new revenue act has been sent to members of the American Paper and Pulp Association by Dr. Hugh P. Baker, executive secretary, as the result of co-operation between that Association and the Cost Association of the Paper Industry. At the request of Dr. Baker, T. J. Burke, secretary-treasurer of the Cost Association, visited Washington to secure first-hand information from some of the Government officials relative to the new act. Among the important changes noted are the following:

Taxes—The excess profits tax will be assessed for the year 1921 or any part thereof and the rate of normal tax will be 10 percent. After the year 1921 there will be no excess profits tax but the normal tax will be 12½ percent.

Specific Exemption—The specific exemption of $2,000 heretofore allowed to all corporations in computing normal tax is now limited to corporations with a net income not exceeding $25,000. This provision includes the year 1921. If the net income exceeds $25,000, the tax will not be more than if the exemption were allowed plus the income in excess of $25,000—that is to say, up to $25,000 in 1921 and $25,250 thereafter.

Consolidated Returns—After 1921 affiliated corporations have the option of making separate returns or a consolidated return. Having exercised the option in 1922, all subsequent returns must be made in the same manner unless permission to change is granted by the commissioner.

Personal Service Corporations—After 1921 personal service corporations will file their returns on the same basis as other corporations, that is to say, the partnership basis will be discontinued.

Losses Carried Forward—If a corporation sustains a loss in the year 1921 or any year thereafter, such loss can be deducted in computing tax for succeeding years.

Bad Debts—Under the Revenue Act of 1921 a corporation is allowed in the discretion of the commissioner to deduct a reasonable addition to the reserve for bad debts or if a debt is recoverable only in part, such debt may be charged off in part. Prior to this provision deductions were only allowed when a debt was definitely ascertained to be uncollectible.

Losses on Investments—Losses on stocks and securities sold or disposed of cannot be deducted if substantially identical stocks or securities are purchased or acquired within 30 days of the sale or disposal. This provision apparently applies to the year 1921 and thereafter.

VACUUM OIL CO. ISSUES INSTRUCTIVE LITERATURE

Two instructive booklets entitled "Oil Engines, Service Ignition Type," and "Stationary Steam Engines, Steam Valve and Cylinder Lubrication," have been compiled and issued by the Vacuum Oil Company, 61 Broadway, New York City.

They describe in a non-technical manner the construction of these types of engines and the functions they perform.

The text matter is interspersed with illustrations in colors, which make the understanding of the text matter much more effectual.

The books are handsomely printed on coated paper with very substantial covers, and a valuable help to anyone interested in power development.

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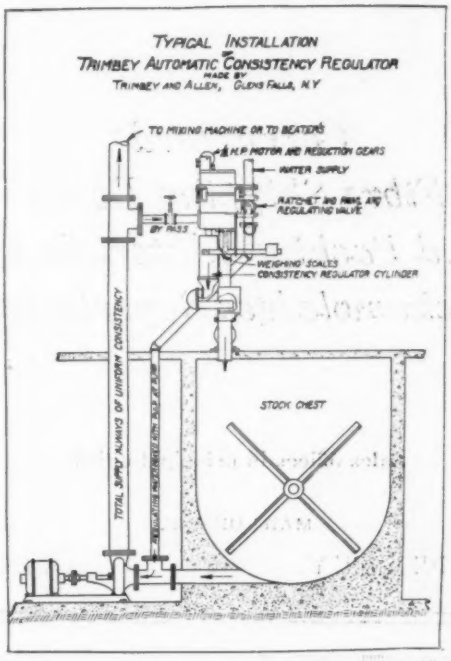

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White sulphite	11-25
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Colored rag	17-50
Bonds—	
White rag	12-40
White sulphite	8-20
Colored sulphite	10-22
Colored rag	14-40
Book—	
No. 1 S. & S. C.	6.50- 7.00
Machine finished	6.00- 6.50
English finished	6.25- 6.75
Coated and enameled	8.50- 9.00
Lithograph, M. F	9.50-12.00
Newsprint—	
Rolls, contract	3.50-
Rolls, transient	3.75- 4.00
Sheets	4.00- 4.25
Side runs	3.25- 3.50
Cover Stock—	
Coated, both sides	9.25-
Coated, one side	9.20-
Tissue—	
No. 1 white, 20x30	.90- 1.10
No. 2 white, 24x36	.80- .90
No. 1 manila, 24x36	.80- .90
Kraft	.90- 1.15
Wrappings—	
No. 1 kraft	7.00- 7.50
No. 2 kraft	6.00- 6.50

Boards—	New York and Chicago
Solid news	42.50-45.00
Straw	45.00-50.00
Plain chip	37.50-40.00
White coated chip	60.00-70.00
Manila coated chip	55.00-60.00
Binders' board	70.00-80.00

Foreman Training at Champion Fibre Co.

Foreman training in the paper industry has actually been started, and the first such class to complete its work with the co-operation of the Federal Board for Vocational Education, ended its work with its twentieth session on November 19, at the Canton, N. C., plant of the Champion Fibre Company.

This is one of the most important developments in the entire campaign of the paper manufacturers of America to develop better trained men in the paper industry. Work of this kind is of greatest assistance in the establishment of educational courses in pulp and paper making for mill employees and the use of the text books which are being prepared under the direction of the Vocational Education Committee and to which the members of the American Paper and Pulp Association and the Canadian Pulp and Paper Association have contributed liberally.

The training class for foreman at the Champion plant is to be duplicated as soon as possible by similar classes in the paper making regions of New York and New England, and later will be extended to all of the paper making sections of the country.

The Champion Company's foremen's conference was arranged by the North Carolina State Board for Vocational Education, in co-operation with the company officials, particularly R. B. Robertson, vice-president and general manager, and A. D. Wood, superintendent of the sulphite department, Wood of the company being a member of the Vocational Educational Committee. In making the preliminary plans the state board was represented by G. W. Goggin, State Supervisor of Industrial Education. The conference was the first of a series planned by J. C. Wright, Chief of the Industrial Education Service of the Federal Board, and the course was conducted on the conference plan by Frank Cushman, agent for the Federal Board, who went to North Carolina from Washington to handle the work.

The course began November 7, and continued until November 19, and is entirely separate from class work being undertaken for the other employees in the mill, in which the Technical Association text books are being used.

The best summary of the work, however, is the report made of the work by Mr. Wood to the Committee on Vocational Education. In this he says:

"The foreman training course was started on November 7 with an enrollment of fifteen foremen, under Mr. Cushman of the Federal Board, and we find that there is great enthusiasm among the members of the class. I might go a step further and state that everybody was enthusiastic about the work which was done.

"The class met each day at 9:00 a. m., at the Champion 'Y' in one of the classrooms and the session lasted until noon. Mr. Cushman met with the superintendents at 1:00 p. m. and was with us until 2:00 p. m., during which time he gave us a review of the work which was being carried on at the foremen's class. He then went into a session with the foremen which lasted until 5:00 p. m.

"It is a strange thing that these men, foremen accustomed to active work in the mill, would leave their daily session of six hours and go home and type and make charts of the day's lessons. At five in the afternoon they seemed to be full of pep and eager to go on. This class was the only one carried on on 'company time.'

"Thirteen other classes meet at the 'Y' in the evening. Among these we have two classes in pulp making and two in paper making using T. A. P. P. I. text books. We divide the session into two three-quarter hour periods, devoting half the time to the study of the books and the other three-quarters of an hour to a lecture and discussion on some phase of mill work. So far this term I have managed to keep my class interested in this way and I think the other teachers find that this is the best way to hold the interest of the pupil."

In another letter he makes this pertinent survey of the course:

"Doubtless every member of the committee will ask the question, 'Is such a class worth while?' While it is too early to measure or weigh its value, in fact it will be a difficult matter to show definite and tangible results later, I feel that the question can safely be answered in the affirmative. Personally, I feel that such a course would be worth while even if put on exclusively in connection with the work for safety first, for the instructional duties of the foreman are put before him in a way that he cannot help but feel his responsibilities. Our vice-president and manager, Mr. Robertson, shares in the belief of the superintendents, that the course is one we could not afford to be without."

A formal report of the conference, giving a resume of each day's work, makes this conclusion:

"Many of the most valuable results to be obtained from this sort of work depends upon things which are, to a considerable extent, intangible. It is therefore unwise to attempt to evaluate them to any great extent in a statistical or mathematical way. Results will undoubtedly become apparent during the weeks and months to come, and only by the passage of time can any definite estimate be made as to the actual value of the work."

The Paper Industry gratefully acknowledges the many handsome and expressive greeting cards received during the past holiday season. A number of very beautiful calendars was received, and further comment is refrained other than to reciprocate our own wishes that the New Year may be a prosperous one for all our friends.

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Wood Pulp

Quotations on foreign wood pulp are hardening to a very perceptible degree. Despite the fact that buying has been rather slow during the last several weeks, which is not an uncommon market condition at the close of the year, when paper manufacturers are indisposed to augment their stocks of raw material unless in immediate need of supplies, prices on all kinds of pulp have strengthened at primary centers, which in turn has made for firmer market prices on this side of the Atlantic. The reason for the higher quotations on Scandinavian, German and Finnish pulps is said to be twofold; first, that producers in Europe have mostly liquidated their stocks and therefore are not pressed to sell, and second, that the sharp advances in exchange on European countries have naturally led to increased prices in American currency. Members of the importing trade are almost a unit in expressing the opinion that prices on Scandinavian pulp will not again reach the low levels touched during the past few months. It is maintained that the question of exchange alone is sufficient to keep prices from falling so low, while it is also stated that stocks in Sweden and Norway have been so reduced and production is so curtailed that there is little likelihood of American consumers obtaining further supplies of foreign pulp at the low levels they have bought in recent months.

At the moment the situation is somewhat unusual in that importers are selling pulp held on the spot in the United States at much lower prices than at which they will accept orders for shipment from primary markets. For instance, No. 1 unbleached sulphate can be purchased by paper mills on the spot here at 2.65 and 2.75 cents per pound ex dock or warehouse, whereas shipment quotations range from 3 cents upward. Swedish kraft pulp is selling at 2.65 cents a pound for spot lots, but importers refuse to take orders for shipment from the other side at less than 3 cents. This irregularity of prices is a reflection of the advances in foreign markets.

From all accounts, available stocks of Scandinavian pulps are far from voluminous at present. In spite of the fairly heavy arrivals into the United States recently, unsold stocks here are said to be light, it being authoritatively estimated that holdings of importers do not exceed 30,000 tons—merely a single month's average importations in pre-war days. Mill stocks on the other side are running low, and it is said that manufacturers in Scandinavia are not increasing their holdings because they have so drastically cut production. Illustrative of how the Swedes have reduced their output, figures for October show that the production of unbleached sulphite in Sweden in that month amounted to but 25,306 tons, compared with 61,903 tons in the same month of 1920; of bleached sulphite 2,611 tons, contrasted with 11,961 tons last year, and of sulphate 10,565 tons, against 15,917 tons in October a year ago.

It is also felt that the sharp advances in prices of domestic sulphite will cause many American papermakers to turn to foreign pulps to supply their wants, which will create a livelier demand for foreign pulp. Moreover, European paper manufacturers are understood to be again buying pulp in more normal volume; all of which, it is contended, should serve to maintain pulp prices and tend to cause advances.

Germany is still largely an unknown quantity in the wood pulp trade. Some import concerns in the United States are bringing in quite a tonnage of German pulp, chiefly sulphite, and are readily marketing it among paper mills at prices on about a parity with those prevailing on Scandinavian pulps. Many reports from England and other European sources tell of the Germans underselling the Swedes, but this does not seem to be the case in the United States market.

Foreign ground wood is selling freely whenever offered and spot lots frequently are bringing a higher price than domestic and Canadian ground wood. One instance is known where a spot lot of imported ground wood sold at $36.50 per ton ex dock New York, though average market quotations are slightly under this level, ranging between $33 and $35.

Receipts at the port of New York in December and current market quotations follow:

Bleached sulphite, No. 1	$ 4.25- 4.50
Unbleached sulphite, No. 1	2.65- 3.00
Easy bleaching	3.25- 3.50
Mitscherlich unbleached	3.00- 3.25
Kraft	2.65- 3.00
Ground wool, per ton	33.00-36.00

J. Andersen & Co., 4,050 bls. from Christiania; Central Union Trust Co., 2,300 bls. from Copenhagen; American Woodpulp Corp., 1,000 bls. from Hamburg, 2,243 bls. from Rotterdam, 6,600 bls. from Sundsvall, 1,400 bls. from Gothenburg and 375 bls. from Bremen; National City Bank, 3,700 bls. from Sundsvall; Scandinavian-American Trading Co., 10,000 bls. from Skutskar, 8,112 bls. from Stockholm, 5,786 bls. from Gothenburg and 750 bls. from Hallstavik; Fred Enders & Co., 2,000 bls. from Soderhamm and 7,500 bls. from Gefle; A. Kramer & Co., 397 bls. from Bremen; H. Hollesen, 3,254 bls. from London; Guaranty Trust Co., 294 bls. from Hamburg; Price & Pierce, 1,860 bls. from Sundsvall; National Bank of Commerce, 1,000 bls. from Sundsvall; Robert Dollar Co., 2,667 bls. from Vancouver; J. F. Patton & Co., 1,000 tons from Dalhouse, N. B.; E. M. Sergeant & Co., 1,025 bls. from Christiania; A. J. Pagel & Co., 3,000 bls. from Stockholm; C. L. Robinson, 3,772 bls. from Gothenburg; Irving National Bank, 3,454 bls. from Hango and 2,970 bls. from Kotka; Lagerloef Trading Co., 1,332 bls. from Hango, 3,343 bls. from Kotka and 7,787 bls. from Montyluoda; M. Gottesman & Co., 1,800 bls. from Christiania; Castle, Gottheil & Overton, 507 lbs. from Rotterdam and 1,000 bls. from Hamburg; E. Butterworth & Co., 120 bls. from Christiania; Brown Bros. & Co., 354 bls. from Hamburg; Order, 1,676 bls. from Hamburg, 5,900 bls. from Sundsvall, 6,500 bls. from Soderhamm, 340 bls. from Copenhagen, 3,029 bls. from Hango and 3,000 tons from Christiania.

Paper Stock

Importations of papermaking materials into the United States continued fairly heavy during December, notwithstanding that demand from consumers was comparatively slow, thereby inferring that most of the supply imported last month was against back orders or brought in by import houses in anticipation of a revival of buying by paper mills after the turn of the year. The broad fluctuations in exchange on European countries in December, thus making for a good deal of difficulty for importers in negotiating purchases on the other side of the Atlantic, also is a factor leading to the belief that the bulk of stock brought in during the month was on previous orders.

Arrivals of old rope were particularly large in December, reflecting the fairly steady demand for this material from mills and the comparatively light supply of domestic rope. Something in the neighborhood of 4,400 bales and coils of old rope were landed at the port of New York alone, and it is presumed similarly large shipments reached other Atlantic ports. Imports of papermaking rags continued fairly large, and more old bagging was received in December than in the several preceding months. Arrivals through the port of New York in December follow:

Old Rope

Brown Bros. & Co., 75 coils from Glasgow, 656 coils and 49 bls. from Hull, 124 coils from Bristol, 155 coils from Leith and 78 coils from Liverpool; W. H. Cummings & Son, 95 bls. from Copenhagen; R. F. Downing & Co., 341 coils from London and 140 bls. from Barcelona; N. E. Berzen, 272 coils from Hull; George W. Millar & Co., 69 coils from Hull; Salomon Bros. & Co., 108 coils from Hull; Ladenburg, Thalman & Co., 105 coils from Hamburg; First National Bank of Boston, 484 bls. from Antwerp and 351 bls. from Rotterdam; Mechanics & Metals National Bank, 69 coils from Bristol; Bank of Montreal, 324 coils from Rotterdam; American Express Co., 147 coils from London; Old Colony Trust Co., 93 bls. from Barcelona; National City Bank, 41 bls. from Barcelona; W. Schall & Co., 85 bls. from Barcelona; Gallagher & Ascher, 108 bls. from Rotterdam; Order, 154 bls. from Bremen, 31 coils from London and 696 bls. from Genoa.

Old Bagging

E. J. Keller Co., 157 bls. from Hamburg, 53 bls. from Algiers, 300 bls. from Manchester and 34 bls. from Havre; Maurice O'Meara Co., 126 bls. from Manchester and 131 bls. from Rotterdam; Castle, Gottheil & Overton, 182 bls. from Manchester and 121 bls. from Antwerp; E. Butterworth & Co., 603 bls. from Manchester and 175 bls. from Rotterdam; International

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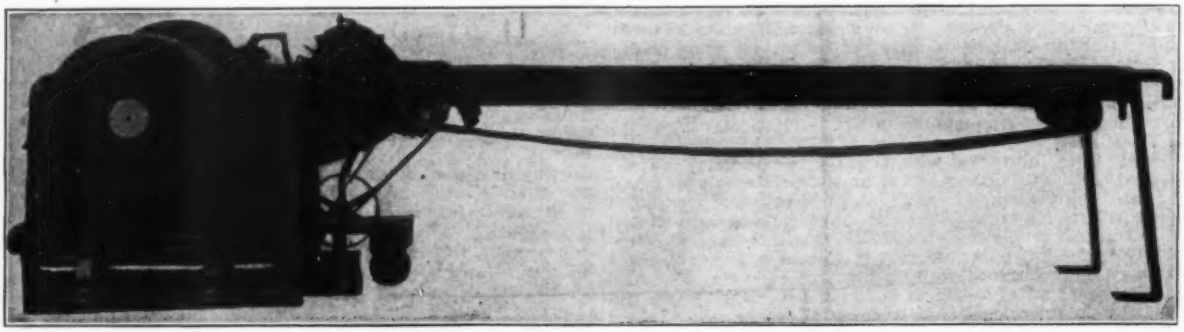

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Banking Corp., 187 bls. from Manchester; Daniel M. Hicks, Inc., 143 bls. from Manchester and 85 bls. from Leith; Equitable Trust Co., 38 bls. from Havre and 74 bls. from Copenhagen; National City Bank, 226 bls. from Barcelona; Mechanics & Metals National Bank, 39 bls. from Rotterdam.

Rags

American Woodpulp Corp., 317 bls. from Hamburg and 896 bls. from Bremen; Goldman, Sachs & Co., 312 bls. from Antwerp, 687 bls. from Hamburg and 317 bls. from Havre; American Express Co., 253 bls. from London; E. J. Keller & Co., 446 bls. from Bremen, 378 bls. from London, 216 bls. from Hamburg, 449 bls. from Algiers, 1,051 bls. from Havre, 1,055 bls. from Rotterdam, 1,116 bls. from Antwerp and 304 Bls. from Stockholm; Bernard, Judae & Co., 13 bls. from London; Guaranty Trust Co., 401 bls. from Hamburg and 539 bls. from Antwerp; Bankers' Trust Co., 839 bls. from Hamburg; J. M. Jaffe, 120 bls. from Hamburg; Ladenburg, Thalman & Co., 263 bls. from Hamburg, 146 bls. from Havre and 759 bls. from Bremen; Maurice O'Meara Co., 58 bls. from Hamburg and 131 bls. from Buenos Aires; Irving National Bank, 224 bls. from Hamburg and 291 bls. from Havre; R. F. Downing & Co., 181 bls. from Manchester, 233 bls. from Barcelona, 219 bls. from Bremen and 133 bls. from Rotterdam; W. Hughes & Co., 746 bls. from Rotterdam and 32 bls. from Belfast; George W. Miller & Co., 680 bls. from Rotterdam; Adams Bag Co., 6 bls. from Havre; Mechanics & Metals National Bank, 2,123 bls. from Havre; Salomon Bros. & Co., 869 bls. from Havre; Equitable Trust Co., 237 bls. from Hamburg, 226 bls. from Oran, 43 bls. from Havre and 627 bls. from Marseilles; F. P. Gaskell & Co., 53 bls. from Bremen; P. Berlowitz, 403 bls. from Bremen; Katzenstein & Keene, 124 bls. from Havre; Castle, Gottheil & Overton, 133 bls. from Bordeaux, 672 bls. from Havre, 320 bls. from Rotterdam and 94 bls. from Bremen; Atlantic National Bank, 408 bls. from Hamburg; J. R. Walker & Co., 23 bls. from Hull; Order, 529 bls. from Copenhagen, 16 bls. from London, 1,768 bls. from Havre and 236 bls. from Antwerp.

Miscellaneous Paper Stock

Equitable Trust Co., 183 bls. from Glasgow, 187 bls. from Leith and 64 bls. from Belfast; Davies, Turner & Co., 180 bls. from London; E. J. Keller Co., 3 bls. from Antwerp; Mechanics & Metals National Bank, 92 bls. from London; Maurice O'Meara Co., 232 bls. from Hamburg; Irving National Bank, 57 bls. from Hamburg and 42 bls. from Glasgow; American Express Co., 411 bls. from Belfast; Albion Trading Co., 49 bls. from Rotterdam; Order, 7 bls. from Glasgow.

Paper

Importations of paper into the United States, judging from the shipments received at the port of New York, were fairly large in December. Sizable lots of newsprint came in from Scandinavian, German and Finnish sources, imports of this kind of paper exceeding those of the several preceding months by a good margin. Imports of cigarette paper from France were also moderately heavy, and there were several large consignments of wrapping paper received.

Arrivals at the port of New York in December follow:

Cigarette

American Tobacco Co., 388 cs. from Havre and 1,165 cs. from Bordeaux; P. J. Schweitzer, 50 cs. from Marseilles; Surbrug Co., 38 cs. from Havre; R. J. Reynolds Tobacco Co., 2,310 cs. from Bordeaux; Rose & Frank Co., 144 cs. from Havre; United Fruit Co., 40 cs. from Barcelona; B. E. Teale, 50 cs. from Lisbon; Lloyd Royal Belge, 13 cs. from Antwerp; E. Levy, 10 bls. from Constantinople; Order, 7 cs. from Marseilles.

Printing

Sherwin Bros., 96 rolls from Hamburg; B. F. Drakenfeld & Co., 38 cs. from Liverpool; J. W. Warre, 52 cs. from Havana; New York Globe, 4 rolls from Hamburg; L. A. Smythe Co., 16 cs. from Hamburg and 48 cs. from Rotterdam; Atlantic National Bank, 234 rolls from Copenhagen and 380 rolls from Gothenburg; New York Tribune, 673 rolls from Christiania; Publishers' Buying Corp., 214 rolls from Christiania; A. Moltzan, 350 rolls from Christiania; Haring Paper Corp., 1,234 rolls from Christiania; W. H. Hetherington & Co., 19 cs. from Glasgow; Chemical National Bank, 404 rolls from Copenhagen and 216 rolls from Hamburg; E. C. Melby, 94 rolls from Christiania; National City Bank, 348 rolls from Norrkoping, 179 rolls from Hallstavik and 256 rolls from Copenhagen; Chase National Bank, 182 rolls from Norrkoping; Agros Corp., 612 rolls from Helsingfors; L. A. Consmiller, 466 cs. from Rotterdam; American Express Co., 795 rolls from Sundsvall; American Woodpulp Corp., 1,945 rolls from Sundsvall; J. F. Noland, 297 rolls from Christiania; F. B. Vandegrift & Co., 143 cs. from Hamburg; C. Steiner, 57 cs. from Hamburg; National Bank of Commerce, 452 rolls from Gothenburg; Sun Printing and Publishing Co., 2,670 rolls from Gothenburg;

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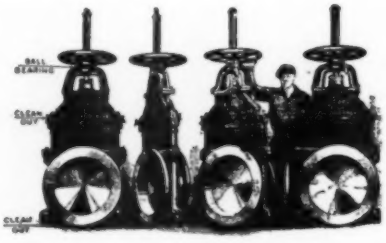

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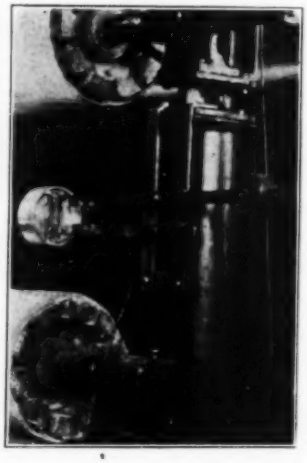

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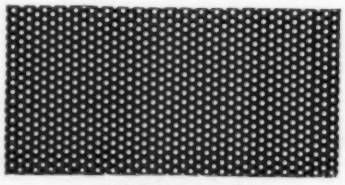
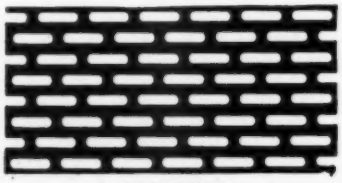
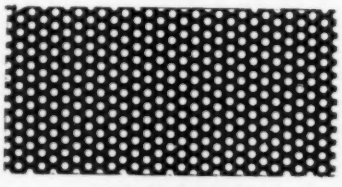


.065 inch round



⅛ x ⅓" Slots



3/32 inch round

Steel, Copper, Brass, Bronze and other alloys punched for Centrifugal and Rotary Screens, Pulp Washers, Drainer Bottoms, Filter Plates, etc.

CHARLES MUNDT & SONS **57-65 Fairmount Avenue, Jersey City, N. J.**

C. L. Robinson, 783 rolls from Gothenburg; Irving National Bank, 198 rolls from Kotka; Parsons & Whittemore, 26 rolls from Christiania; Maurice O'Meara Co., 82 rolls from Christiania; Young Publishing Co., 159 rolls from Christiania; Consumers' Paper Mills, 112 rolls from Kotka; First National Bank of Boston, 97 rolls from Kotka; D. S. Walton & Co., 934 rolls from Hamburg; New York American, 3,544 rolls from Hallstavik; Equitable Trust Co., 1,715 rolls from Hallstavik; United States Line, 173 rolls from Bremen; Guaranty Trust Co., 46 cs. from Antwerp; Mail & Express Co., 49 rolls from Christiania; C. B. Hewitt & Bros., 21 rolls from Christiania; Order, 586 rolls from Christiania, 430 rolls from Hamburg, 2,636 rolls from Kotka and 173 rolls from Bremen.

Wrapping

Republic Bag & Paper Co., 3,371 rolls from Hamburg; Blauvelt Wiley Paper Mfg. Co., 41 bls. from Glasgow; Roberts, Cushman & Co., 2 cs. from Genoa; Irving National Bank, 442 bls. from Sundsvall; Maurice O'Meara Co., 147 bls. from Christiania; Philadelphia National Bank, 122 rolls from Hamburg; F. Baker, 304 rolls from Gothenburg; M. Winter, 1,839 rolls from Hamburg; Order, 542 rolls from Hamburg.

Hanging

A. Murphy & Co., 14 bls. from London, 4 bls. from Southampton, 13 bls. from Liverpool and 5 cs. from Havre; A. C. Dodman, 14 cs. from Antwerp, 49 bls. from Liverpool and 6 bls. from London; Prager Co., 3,907 rolls from Antwerp; F. T. Welch & Co., 2 cs. from Antwerp; W. H. S. Lloyd & Co., 63 bls. from London, 14 bls. from Liverpool and 2 cs. from Antwerp; R. F. Lang, 472 bls. from Hamburg; R. Fabien & Co., 14 cs. from Havre; Bech, Van Siclen & Co., 6 cs. from Yokohama; R. F. Downing & Co., 24 bls. from London; Order, 12 bls. from London.

Writing

Goodman & Levy, 7 cs. from Havre; American Express Co., 2 cs. from Southampton; Irving National Bank, 2 cs. from Antwerp; United States Line, 456 cs. from Bremen; Order, 456 cs. from Bremen and 2 cs. from London.

Drawing

Keuffel & Esser Co., 91 rolls and 9 cs. from Hamburg and 20 cs. from Rotterdam; Lunham & Moore, 3 cs. from London and 12 cs. from Bremen; Sternberg & Co., 11 cs. from Hamburg; Favor, Ruhl & Co., 4 cs. from London.

Filter

Lunham & Moore, 9 cs. from London, 19 cs. from Bremen and 3 cs. from Rotterdam; Elmer & Amend, 3 cs. from Rotterdam; E. Fougera & Co., 108 cs. from Bordeaux and 45 cs. from Southampton; J. Manheimer, 158 bls. from Bordeaux; Druggists' Supply Co., 51 cs. from London.

Tissue

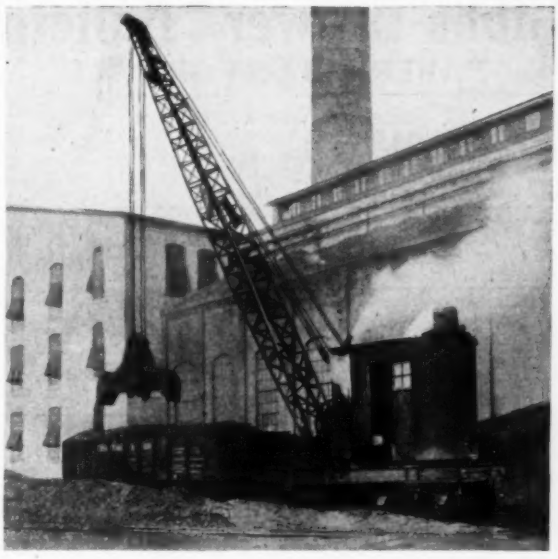
R. Hoe & Co., 2 bls. from London; Wilkinson Bros. & Co., 12 bls. from Liverpool; F. C. Strype, 9 cs. from Liverpool; Meadows, Wye & Co., 5 cs. from Liverpool; Boera Bros., 22 bls. from Valencia.

Boards

International Forwarding Co., 4 cs. from Hamburg; New York Label & Box Works, 2 cs. from Hamburg and 2 cs. from Rotterdam; Buschman Bros,, 439 rolls from Rotterdam; U. S. Forwarding Co., 4 cs. from Hamburg; Metropolitan Importing & Mfg. Co., 11 cs. from Hamburg; Bernard, Judae & Co., 9 cs. from Hamburg; H. Reeve Angel & Co., 34 bls. from Hamburg; Wiebusch Calendar Importing Co., 7 cs. from Hamburg; Bendix Paper Co., 8 cs. from Hamburg; Prager Co., 17 cs. from Hamburg; Happel & McAvoy, 16 cs. from Hamburg; A. Bourjois & Co., 6 cs. from Havre; C. B. Richard & Co., 3 cs. from Bremen; Knauth, Nachod & Kuhne, 41 cs. from Bremen and 2 cs. from Hamburg; Order, 5 cs. from Hamburg and 30 cs. from Rotterdam.

Miscellaneous

American Express Co., 2 bls. from London, 13 cs. from Hamburg and 6 cs. from Copenhagen; L. A. Consmiller, 9 cs. from Hamburg; Baldwin Universal Co., 4 cs. from Hamburg; J. W. Hampton, Jr., & Co., 3 cs. from Havre; T. D. Downing & Co., 10 cs. from Hamburg; M. J. Corbett & Co., 18 cs. from Hamburg; F. B. Vandegrift & Co., 3 cs. from Hamburg; W. A. Ritz, 14 cs. from Hamburg; H. W. Robinson & Co., 3 cs. from Hamburg; Gimbel Bros., 4 cs. from Hamburg; Kaufman & Straus Co., 3 cs. from Hamburg; Japan Paper Co., 280 cs. from Genoa and 30 cs. from Yokohama; Davies, Turner & Co., 5 cs. from Hamburg; Guaranty Trust Co., 46 bls. from Hamburg; Bernard, Judae & Co., 2 cs. from Hamburg; R. Reiners, Inc., 12 cs. from Bremen; C. A. Johnson, 20 bls. from Liverpool; C. Wildermann Co., 10 cs. from Hamburg; G. J. Kelly, 2 cs. from Hamburg; F. W. Frost & Co., 25 cs. from Rotterdam; Canson & Montgolfer, 14 cs. from Havre.



Our Best Labor-Saving Device

Writing us recently the president of the Kalamazoo Vegetable Parchment Co. said, "We appreciate very much the receipt of your catalog, as it gives us a good many ideas which we will undoubtedly incorporate into our new mill.

"We are mighty glad to know that you make other things beside locomotive cranes, one of which we purchased from you some years ago, and which we have found in every respect the best labor-saving device that we have about our entire plant."

If you are interested in the handling of materials we want to remind you that Brownhoist is also interested in this subject. Over 40 years of engineering and crane building experience can be yours on any handling subject. And perhaps we can give you some valuable information, as we did the above company.

The Brown Hoisting Machinery Co.
Cleveland, Ohio

Branch offices, New York, Pittsburgh, Chicago, San Francisco and New Orleans

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Gibbs-Brower Bulletin

PAPER MILLS FOR SALE

In the East

1. Book Paper and Specialties Mill. Fourdrinier Machine trimming 76 inches. 15 tons 24 hours. Also Ground Wood Pulp Mill. Grinders and Wet Machines. 5 tons 24 hours. Excellent water power throughout, also steam. Railroad sidings.

2. Bogus, Bristol, Hardware, Textile Wrappers and Ticket Stock Mill. Three Cylinder Machine trimming 52 inches. 6 tons 24 hours. Good water power, steam and electricity. Railroad siding.

3. Toilet and Crepe Tissue Mill. Fourdrinier Machine trimming 67 inches. 3 tons 24 hours. Water and steam. Railroad siding.

4. Patent Coated, Card Middles, Container Board Mill. Two six-cylinder machines trimming 86 and 94 inches, 100 tons 24 hours. Water and steam. Railroad siding.

5. Sheathing and Fire Work Board Mill. Three cylinder machine trimming 56 inches. 9 tons 24 hours. Good water power, steam and electricity. Railroad siding.

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Fourdrinier Parts: Pusey & Jones 137", 118", 112", 100."
Press Parts for Paper Machines: Pusey & Jones Bell Crank housing, two sets 18" x 114", three sets 18" x 110", two sets 18" x 96", Black & Clawson swing arm housings with rolls.
Dryers: Four 48" x 111", sixteen 48" x 106", ten 48" x 68", one 84" x 67", eleven 42" x 66".
Marshall Drives: 6 Black & Clawson self-contained stand with friction clutch cone pulley and 7" mortise gears. Mortise gears and pinions for Pusey & Jones Marshall drives 5" to 8" face.
Chilled Calenders: One 66" face, five roll.
Dillon Doctors: for Machine Calenders 60" to 120" face.
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Reels: Pusey & Jones two drum upright 48" to 114".
Beaters: Six 72" x 42" Noble & Wood, two 66" x 42" Noble & Wood, equipped with three cylinder washers; one Dilts 62" x 50" iron tub, one Jones 62" x 52", seven Horne 36" x 36".
Jordans: One Wagg Majestic, three No. 2 Dillon Improved, one Large Horne, five Monarch, two Pope Brushing engines.
Screens: Three 12 plate open side Packer.
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Revolving Sheet Cutters: One 104" Horne, one 84" Clark, one 50" Hamblet diagonal, two 42" Finlay, four 61" Hamblet, four 61" Finlay.
Wet Machines: Four 72" Bagley & Sewall Hydraulic.

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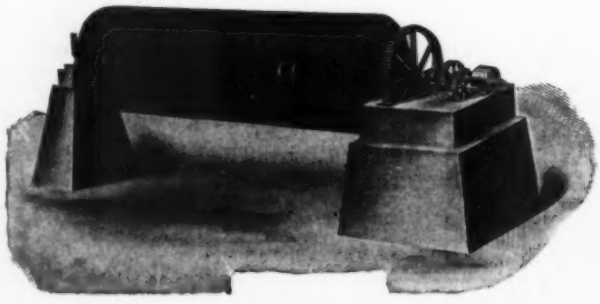
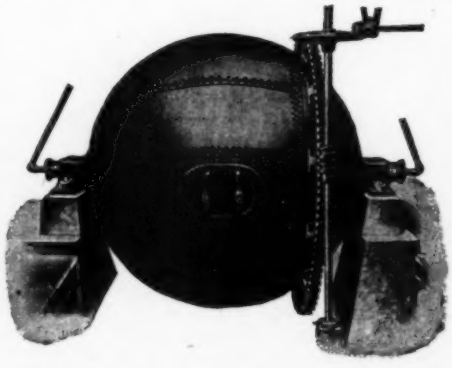
BIGGS

Globe and Cylinder Rotary Bleaching Boilers





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